

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR THE

LAKE SHAFER - LAKE ENHANCEMENT PROJECT

AREA 1: HONEY CREEK

Division A: Lake Dredging Contract

Division B: Sediment Placement Site Contract

FOR THE

**SHAFER - FREEMAN LAKES ENVIRONMENTAL
CONSERVATION CORPORATION**

January, 1997

Property of
Lake and River Enhancement Section
Division of Fish and Wildlife/IDNR
402 W. Washington Street, W-273
Indianapolis, IN 46204

**COMMONWEALTH
ENGINEERS, INC.**

*Environmental Engineers and Consultants
Indianapolis, Indiana*

SET NO. _____

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BY THE

SHAFER - FREEMAN LAKES ENVIRONMENTAL
CONSERVATION CORPORATION

January, 1997

CORPORATION OFFICIALS

Robert Coates
Don Tribbett
Barbara Kawecki
George Sheehan

President
V-President
Secretary
Treasurer

**COMMONWEALTH
ENGINEERS, INC.**

*Environmental Engineers and Consultants
Indianapolis, Indiana 46237*

CERTIFIED BY: _____

G. Edwin Tinkle II P.E.
Indiana P.E. No. 15139

DATE: _____

**CONTRACT DOCUMENTS AND SPECIFICATIONS
FOR THE**

LAKE SHAFER - LAKE ENHANCEMENT PROJECT

AREA 1: HONEY CREEK

Division A: Lake Dredging Contract

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PART 1

ADVERTISEMENT FOR BIDS

ADVERTISEMENT FOR BIDS

**SHAFER-FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORPORATION**

**LAKE SHAFER LAKE ENHANCEMENT PROJECT
AREA 1: HONEY CREEK**

**Division A: Lake Dredging Contract
Division B: Sediment Placement Site Contract**

NOTICE IS HEREBY GIVEN that the Shafer-Freeman Lakes Environmental Conservation Corporation of White County, Indiana, by and through its Board of Directors, hereinafter referred to as the OWNER, will receive sealed proposals for the construction of the LAKE SHAFER LAKE ENHANCEMENT PROJECT, AREA 1, HONEY CREEK: DIVISION A: LAKE DREDGING CONTRACT AND DIVISION B: SEDIMENT PLACEMENT SITE CONTRACT, in White County, Indiana.

Sealed proposals are invited and may be forwarded by registered mail, addressed to the Shafer-Freeman Lakes Environmental Conservation Corporation in care of Robert Coates, or delivered in person to the bid opening, and will be considered by the Owner at a public meeting called to receive and open such proposals not later than 1:00 P.M. (local time) on _____, 1997 at 218 N. Main, P.O. Box 372, Monticello, Indiana 47960. Proposals received after said time will be returned unopened.

A prebid meeting will be held at _____ A.M. (local time) on _____, 1997 at the above office. All prime contractors, subcontractors, small, minority or women business enterprises and other interested parties are invited to attend.

The Lake Shafer Lake Enhancement Project, Area 1, Honey Creek: Division A: Lake Dredging Contract and Division B: Sediment Placement Site Contract, which is to be funded locally by the Owner, will be constructed under two (2) separate contracts defined and outlined as follows:

A. Division A: Lake Dredging Contract:

The construction of sediment traps to facilitate sediment and nutrient removal at the Honey Creek tributary to Lake Shafer;

B. Division B: Sediment Placement Site Contract:

The construction of an upland earth dike containment area for sediment placement and to facilitate dewatering of sediment removed in Division A.

Bidders may elect to bid on one or both Divisions (combination bid) in order to provide the Owner with the most cost effective bid price. Bidders that elect to bid on both Divisions shall submit a separate letter with the bid indicating the amount of deduct that will be made if the bidder is awarded both Divisions "A" and "B" contracts.

Plans and Specifications for the Project are on file and may be examined at the following locations:

- ▶ Commonwealth Engineers, Inc. Indianapolis, Indiana
- ▶ Shafer-Freeman Lakes Environmental Conservation Corporation Monticello, Indiana
- ▶ F.W. Dodge Office Indianapolis, Indiana
- ▶ Construction League Indianapolis, Indiana

Copies of the Specifications may be obtained from Commonwealth Engineers, Inc., at 7256 Company Drive, Indianapolis, Indiana, 46237 upon payment of a non-refundable fee of Seventy-Five Dollars (\$75.00) in the form of a check or money order made payable to Commonwealth Engineers, Inc. Requests for Specifications must also include a return **street address**; post office box numbers are not acceptable. Partial sets of Specifications are not available. Copies of any and all addenda which may be issued for this Project will be included with the purchased documents and will be forwarded to all Plan and Specification holders.

The work to be performed and the proposal to be submitted shall include sufficient and proper sums for all General Construction, Mechanical Installation, Labor, Materials, Tools, Equipment, Taxes (both Federal and State), Permits, Licenses, Insurance, Service Costs, and so forth incidental to and required for the construction of the improvements.

Each proposal must be enclosed in a sealed envelope bearing the title of the Project and the name and address of the Bidder. All proposals must be submitted on the proposal forms as identified in the Contract Documents and Specifications.

Each proposal shall be accompanied by a certified check or acceptable bidder's bond made payable to the OWNER, in a sum of not less than five percent (5%) of the total amount of the highest aggregate proposal, which check or bond will be held by the OWNER as evidence that the bidder will, if awarded the Contract, enter into the same with the OWNER upon notification from him to do so within ten (10) days of said notification.

Approved performance and payment bonds guaranteeing faithful and proper performance of the work and materials, to be executed by an acceptable surety company, will be required of the Contractor at the time he executes his contract. The bonds will be in the amount of 100% of the Contract Price and must be in full force and effect throughout the term of the Construction Contract plus a period of 12 months from the date of substantial completion.

The OWNER reserves the right to reject any proposal as may be deemed necessary or in the best interest of the OWNER, and to waive any and all informalities in bidding. Any proposal may be withdrawn prior to the above scheduled time for the opening of proposals or authorized postponement thereof. Any proposal received after the time and date specified will not be considered. NO proposal may be withdrawn after the scheduled closing time for receipt of bids for at least ninety (90) days.

In addition, the Shafer-Freeman Lakes Environmental Conservation Corporation reserves the right to reduce or eliminate portions of the projects to stay within the funds allocated for this work.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Project throughout.

Proposals shall be properly and completely executed on Indiana Form 96, included in the Specifications. Proposals shall include all information requested by Indiana Form 96 (Revised, 1987). Under Section III of Form 96 the Bidder shall submit a financial statement. A copy of the proposed Financial Statement to be submitted with the Bid is included in the Bid Proposal Documents Section of these Specifications. The OWNER may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any Bid if the evidence submitted by, or investigation of such Bidder fails to satisfy the OWNER that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the work contemplated therein.

Each Bidder is responsible for inspecting the Project site and for reading and being thoroughly familiar with the Contract Documents. The failure or omission of any Bidder to do any of the foregoing shall in no way relieve any Bidder from any obligation in respect to its Bid.

This Project has no established wage scales.

Any Contract awarded under this Advertisement for Bids is expected to be funded locally by the OWNER.

**SHAFFER-FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORP.**

/S/ Robert Coates, President

ATTEST: _____
/S/ Barbara Kawecki, Secretary

DATED: _____

PART 2

INFORMATION FOR BIDDERS

PART 2
INFORMATION FOR BIDDERS

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PART 2

INFORMATION FOR BIDDERS

1. Definitions

Owner:	The Owner shall mean the Shafer-Freeman Lakes Environmental Conservation Corporation (SFLECC). The Owner will be represented by and through its duly elected or appointed governing board or authorized agent.
Engineer:	The Engineer; Commonwealth Engineers, Inc. or their authorized agent.
Contractor:	The person, firm, partnership or corporation to whom the contracts are awarded by the Owner, and who is subject to the terms thereof.
Contract Documents:	The Contract Documents shall consist of the Specifications, Agreement, Performance Bond, Payment Bond, Notice of Award, Notice to Proceed, Contract Change Orders, the Plans and all Addenda issued thereto by Commonwealth Engineers, Inc.

2. Scope of Work

Bids are to cover the furnishing of labor and materials for constructing and making ready for use, the structures, equipment, piping, appurtenances and other works described in these Specifications and Plans, attached hereto and as further incidental or necessary for the entire satisfactory and enduring completion of each division bid upon, including the protection of all property traversed or approached.

There are two (2) divisions included in these plans and specifications. Division A is for the Dredging Contract and Division B is for the Sediment Placement Site Contract. The bidder has the right to bid both divisions or just one of the two, however.

3. Bidder's Responsibilities

Bidders shall carefully examine the entire site of the work, the adjacent premises and the various means of approach to the site, and shall make all necessary investigations to acquaint themselves thoroughly with the facilities for delivering, placing and operating the necessary construction plant, for delivering and installing the equipment specified, for handling materials at the site, and as to all difficulties that may be encountered in the complete execution of all work under the attached contracts, in accordance with the Plans and Specifications. Bidders shall examine the Specifications and Plans and any other data which may be on file in the office of the Engineer for examination by bidders.

No plea of ignorance of conditions that exist, or of conditions or difficulties that may be encountered in the execution of the work under this contract, as a result of failure to make the necessary examinations and investigations, will be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill in every detail the requirements of said contract, specifications, plans or will be accepted as a basis for any claim for extra compensation.

Upon application, all available information in the possession of the Engineer will be shown to the bidders. No information obtained from any officer, agent, or employee of the Owner shall in any way affect the risk or obligation assumed by the Contractor or relieve him from fulfilling any of the conditions of the contract.

When evaluating the Division A, Dredging Contract, the Bidder shall account for excavating utilizing a hydraulic dredge. The factors to be used in this evaluation shall include, but not be limited to:

- a. Material to be pumped
- b. Digging depth
- c. Terminal (discharge) elevation
- d. Discharge line length
- e. Cutter capability
- f. Height of work face
- g. Swing width
- h. Type of advancing mechanism
- i. Dredge efficiency
- j. Suction line size
- k. Hourly production rate
- l. Total project volume
- m. Production time required
- n. Calendar time required
- o. Trash vs production time
- p. Operational costs
- q. Limited Capacity of the Sediment Placement Site

4. Bid Requirements

Bidders are requested to carefully study and conform to the provisions of the Information for Bidders in order that their bid as submitted be regular, complete and acceptable. All proposals must be executed on the separate copies of the Proposal Forms provided with these Contract Documents and Specifications purchased from the Engineer. The proposals must be legibly written in ink or typed with all prices given in words and figures.

In case of discrepancy between the written words and the figures, the written words shall govern. In case of unit price proposals, the bidder shall fill in the unit price bid for each item and in addition thereto make an extension based on the estimated quantities. In case of incorrect totaling of amounts or where the unit bid price and the extension do not agree, the unit price shall in all cases govern in arriving at the correct extension and/or total for the purpose of comparing bids.

The Owner may consider as informal any proposal on which there is an alteration of or departure from the prescribed form. A conditional or qualified Bid or Proposal may not be accepted.

Each proposal shall be enclosed in a sealed envelope, clearly marked with the name of the project, and contract division, if applicable, in order to guard against opening prior to the time set therefor, and addressed in the manner indicated in the proposal form. The bidder shall also place his firm name and address on the outside of the envelope.

Each proposal must be signed in ink by the bidder with his full name and with his business address or place of residence. The legal status of the bidder, that is, as a corporation, partnership or an individual, must be stated in the proposal. In the case of a partnership, the name and residence of each member must be inserted, and in the case the proposal is submitted by, or on behalf of, a corporation, it must be signed in the name of such corporation by an official who is authorized to bind the bidder, and who shall also affix the corporate seal of such corporation. Such officer or agent must present legal evidence that he has lawful authority to sign such proposal, that the signature is binding upon the corporation and that the corporation has legal existence. In the event any corporation, organized and doing business under the laws of any State other than Indiana, is the successful bidder, such corporation, before a contract for said work is executed, shall present evidence that it is authorized to do business in the State of Indiana.

Any person signing a proposal as the agent of another, or of others, shall have attached thereto a power of attorney evidencing authority to sign in the name of the person for whom it is signed.

The title of the person executing the proposal or contract shall be clearly indicated beneath his signature.

Erasures or other changes with bids must be explained or noted over the signature of the bidder.

Proposals may be withdrawn at any time previous to the time for receiving and opening bids. No proposals may be withdrawn for a period of time as specified in these specifications without the consent of the Owner and/or forfeiture of the bid security to the Owner.

5. Bid Security

Unless otherwise set forth in the "Advertisement for Bids", the bid must be accompanied by a bid guaranty which shall not be less than 5 percent of the amount of the bid, and at the option of the bidder may be a certified check, bank draft, or a bid bond. No bid will be considered unless it is so guaranteed. The certified check or bank draft must be made payable to the order of the Owner. Cash deposits will not be accepted. The bid guaranty shall insure the execution of the contract and the furnishing of both performance and payment bonds by the successful bidder as specified in the Contract Documents. In the case the bid guaranty is in the form of a certified check or bank draft, the Owner will return same to the unsuccessful bidder as soon as practicable after the opening of bids and the determination of the low bidder.

In the event that the party to whom the contract is awarded shall fail or neglect to execute the contract and furnish a satisfactory bond within ten (10) days after the Owner has notified him that the contract is ready for execution, the Owner may determine that the bidder abandoned the contract and thereupon the proposal and acceptance shall be null and void, and the security accompanying the proposal shall be forfeited to and retained by the Owner as liquidated damages for such failure and neglect, and to indemnify the Owner for any loss which may be sustained by failure of the bidder to execute the contract and furnish bond as aforesaid. After the execution of the contract and the acceptance of the bond by the Owner, the bid securities which have been retained by the Owner shall be returned to the respective bidders.

The Contractor shall include in his bid price or prices the cost of all insurance set forth in these Specifications.

6. Bidder's Proposal

The bid shall be completely executed on Form 96 (Revised 1987) as contained in the Bid Proposal Documents Section of the Specifications. In addition, as a part of complying with Section III of Form 96, the Bidder shall completely execute and submit with this bid the Financial Statement, included with these Specifications.

The Owner shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform the work and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The right is reserved to reject any bid where an investigation of the evidence or information submitted by such bidder does not satisfy the Owner that the bidder is qualified to carry out properly the terms of the Contract Documents.

7. Exemption from Indiana Sales Tax

Attention of the bidders is called to the fact that the Owner is exempt from the Indiana Gross Retail Tax Act (sales tax). All materials incorporated as a material or integral part of construction work for the State, County, Township, Municipality, its agencies and instrumentalities are exempt from this tax. The authorized person will furnish upon request to the successful bidder any needed information for purposes of filling-out the Exemption Certificate form.

It is not a blanket exception but it provides that only the purchase of tangible personal property used by the Owner may be purchased exempt from sales tax. The Contractor shall apply for an "Exemption Certificate for Construction Contractors", Form ST-134, Indiana Department of Revenue.

The bidder shall include in all prices offered the cost of all Federal, State and Local income taxes and all taxes imposed on materials and equipment, whether it be sales tax, processing tax or any other form of tax whatsoever with the exception of the above referenced Indiana Sales Tax.

8. Laws

Each bidder must familiarize himself with all laws, ordinances and regulations, whether Federal, State or Local, which by reason of being neglected or violated may affect the work contemplated and must secure and pay the fees required for any permits which may be necessary.

Each and every provision by law and clause required by law to be inserted in this contract, shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein. If through a mistake or otherwise any such provision that is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

9. Award of Contract and Rejection of Bids

An award of contract will be made to the low, responsive, responsible bidder.

In determining the low, responsive, responsible bidder, the Owner reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in the interest of the Owner. Unbalanced bids will be regarded with disfavor.

The Owner may elect to make a tentative award of contract to the low, responsive, responsible bidder(s) pending the sale of bonds or the completion of other financing arrangements. In such event and upon successful completion of the necessary arrangements to fund the total cost of the project, the Owner and the successful bidder to whom the tentative award has been made shall enter into a written contract at the price stated in the proposal and as specified; provided that the elapsed time from the date of the receipt of bids, as required by these specifications, has not expired. The time for execution of the written contract may be extended beyond the period set forth in these Specifications, if such time extension is mutually agreeable to the Owner and the successful bidder. This mutually agreeable extension must be done at no additional cost to the Owner.

In the determination of the low, responsive, responsible bidder, the Owner reserves the right to take into account and give reasonable weight to the following factors:

- 1.) The extent of the bidder's experience on work of the nature involved.
- 2.) The bidder's record as to dependability in the carrying out of other contracts.
- 3.) The probability of the contract being carried to successful completion within the time specified by the methods and with the equipment the bidder proposes to use.
- 4.) Does he have a suitable financial status to meet his obligations.

10. Performance Bond, Payment Bond and Execution of Contracts

The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond within ten (10) calendar days from the date when the Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Contract and Bond forms.

The successful bidder shall furnish both a Performance Bond and Payment Bond, each in the amount of 100 percent of the Contract Price, with a Surety approvable by the Owner. Copies of the form of bonds are included in the Contract Documents. Attorneys-in-fact who sign the Performance and Payment Bonds must file with each bond a certified and effective dated copy of their power of attorney.

In the case of failure of the bidder to execute the Contract and furnish said Performance Bond and Payment Bond within said time, the Owner may at his option consider the bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.

The Owner within ten (10) days of receipt of acceptable Performance Bond, Payment Bond and Contract signed by the party to whom the Contract was awarded shall sign the Contract and return to such party an executed duplicate of the Contract. Should the Owner

not execute the Contract within such period, the bidder may by written notice withdraw his signed Contract. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

The Notice to Proceed may be issued to the Contractor within ten (10) days after the signing of the Construction contract. Should there be reasons why the Notice to Proceed cannot be issued within such period, then the time may be extended by mutual agreement between the Owner and the Contractor.

The Contractor must also furnish to the Owner, with the execution of a contract, a Certificate of Insurance issued by the insurer qualified to do business in the State of Indiana, certifying that he is covered by Workmen's Compensation in accordance with statutory requirements and by insurance against public liability and property damage sufficient to cover any claims which may arise out of performance of the work under the proposed contract.

11. Time for Completion and Liquidated Damages

The Contractor shall commence work on or before the date specified in the written "Notice to Proceed" from the Owner and shall fully complete the project within the time specified in the Specifications.

For every calendar day that full completion is delayed beyond the time specified, a specified sum shall be paid by the Contractor to the Owner and it is hereby agreed by both parties that such costs and expenses represent liquidated damages caused by the delay of completion.

The time limit in number of calendar days from the date of the Notice to Proceed and the amount to be charged as liquidated damages shall be as set out in these Specifications.

In estimating the time necessary for completing the job, allowance has been made, so far as possible, for all the ordinary delays and hindrances incidental to such work, i.e., weather, delays in securing materials, workmen or otherwise.

12. Completion of Plans and Specifications

Upon issuance to prospective bidders, the physical make-up and content of the plans, specifications and contract documents is intended to be complete for preparing and submitting of a proposal. However, each bidder shall verify to his own satisfaction that all material issued to him is indeed complete. Should he discover that a page, sheet, etc. is missing he shall notify the Engineer in writing and it will be forwarded to him. After bids have been submitted, no claims of ignorance of these requirements of bidding or of construction due to such missing or overlooked material will be recognized.

13. Interpretations

In general, no answer will be given in reply to an oral question if the question involves an interpretation of the intent or meaning of the drawings or contract documents, or the equality or use of products or methods other than those definitely designated or described on the plans or in the specifications. Any information given to the bidders other than by means of the plans and contract documents or by addenda as described below is given informally and shall not be used as the basis of a claim against the Owner or the Engineer.

To receive consideration, such questions shall be submitted in writing to the Owner at least seven days before the advertised date for receipt of bids. If the question involves equality or use of products or methods, it must be accompanied by drawings, specifications, or other data, in sufficient detail to enable the Owner to determine the equality of suitability of the product or method. In general the Owner will neither approve nor disapprove particular products prior to the opening of bids; such products will be considered when offered by the Contractor for incorporation into the work.

The Owner will arrange as addenda, which shall become a part of the contract, all questions received as above provided with his decision regarding each. At least five days prior to the receipt of bids, he will send a copy of those addenda to each of those who have taken out the plans and contract documents.

Unless such action shall have been taken by the Contractor and approval obtained, he agrees to use the product or method designated or described in the specifications as amended by these addenda.

Each bidder shall acknowledge receipt of all addenda issued, by number, on his proposal form.

14. Local Features and Underground Information

The attention of the bidders is directed to the information given on the plans or shown in the Specifications relating to soundings and borings, materials encountered, ground water, subsurface conditions and existing pipes, conduits and other structures. This information is from the best available sources presently available to the Owner. All such information and the plans of the existing construction are furnished only for the information and convenience of the bidder.

It is agreed and understood that the Owner does not warrant or guarantee that the materials, conditions, and pipes or other structures encountered during construction will be the same as those indicated by the boring samples or by the information given on the drawings or in the Contract Documents. The bidder must satisfy himself regarding the character, quantities, and conditions of the various materials and the work to be done. It further is agreed and understood that the bidder or the Contractor will not use any of the information made available to him or obtained in any examination made by him in any manner as a basis or ground of claim or demand of any variance which may exist between the information offered and the actual materials or structures encountered during the construction work, except as may otherwise be provided for in the Contract Documents.

It is further understood and agreed that the bidder or the Contractor will not use any information made available to him or obtained by any examination made by him in any manner as a basis or ground of claim or demand of any nature against the Owner or Engineers, arising from or by reason of any variance which may exist between the information offered and the actual materials and structures encountered during the construction work.

15. Modification Prior to Bid Opening

The right is reserved, as the interest of the Owner may require, to revise or amend the specifications and/or drawings prior to the date set for opening bids. Such revisions and amendments, if any, will be announced by an addendum or addenda to the Contract Documents.

Copies of such addenda as may be issued will be furnished to all prospective bidders. If the revisions and amendments are of a nature which requires material changes in quantities or prices bid or both, the date set for opening bids may be postponed by such number of days as in the opinion of the Owner's Engineer will enable bidders to revise their bids. In such case, the addendum will include an announcement of the new date for opening bids.

16. Wage Scales NOT APPLICABLE FOR AREA 1

17. Safety and Health Regulations for Construction

The successful bidder shall be responsible for all obligations prescribed as employer obligations under Chapter XVII of Title 29, Code of Federal Regulations for Construction, OSHA (PL 91-596) and the Contract Work Hours and Safety Standards Act (PL 91-54).

All questions regarding compliance and enforcement, as well as requests for the regulations, should be directed to the Department of Labor.

18. Responsibility of the Contractor

Attention here is particularly directed to the provisions of the Contract whereby the Contractor shall be responsible for any loss or damage which may occur during process of the work or any part thereof, and also whereby the Contractor shall make good any faulty work or material which becomes evident within twelve months after its substantial completion, unless otherwise specified elsewhere herein.

19. Outside Interests

No official of the Owner who is authorized in such capacity on behalf of the Owner to negotiate, make, accept, or approve or the taking part in negotiating, making, accepting, or approving, any engineering, inspection, construction or material supply contracts or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in the contract or in any part thereof. No officer, employee, attorney, engineer or inspector of or for the Owner, who is authorized in such capacity on behalf of the Owner to exercise any legislative, executive, supervisory, or other similar functions in connection with the construction of the project shall become directly or indirectly interested personally in this contract or any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

20. Items to be Submitted with Bid

The bidder shall submit as a part of his bid the following:

- A. Contractors Bid and Bid Schedule (A and/or B) - completely executed and signed. (Executed) Indiana State Bid Form No. 96 (Revised, 1987), completely signed and executed.
- B. Non-Collusion Affidavit - Completely executed, signed and notarized (Standard Form 96 Revised, 1987)
- C. Bid Bond - acceptable bidder's bond or certified check in the amount of not less than five (5%) percent of the total bid price.
- D. Financial Statement for Bidders - completely signed and executed.
- E. Letter indicating **deduct** amount if Bidder is awarded both Divisions "A" and "B" contracts.

PART 3

GENERAL CONDITIONS

GENERAL CONDITIONS

- | | |
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1. DEFINITIONS

1.1. Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated and shall be applicable to both the singular and plural thereof:

1.2. ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications, or corrections.

1.3. BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4. BIDDER - Any person, firm, or corporation submitting a BID for the WORK.

1.5. BONDS - Bid, Performance, and Payment Bonds and other instruments of surety, furnished by the CONTRACTOR and the CONTRACTOR'S surety in accordance with the CONTRACT DOCUMENTS.

1.6. CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion, or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7. CONTRACT DOCUMENTS - The contract, including Advertisement For Bids, Information For BIDDERS, BID, BID BOND, Agreement, Payment BOND, Performance BOND, NOTICE OF Award, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8. CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.10 CONTRACTOR - The person, firm, or corporation with whom the OWNER has executed the Agreement.

1.11 DRAWINGS - The parts of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

1.12 ENGINEER - The person, firm, or corporation named as such in the CONTRACT DOCUMENTS.

1.13 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

1.14 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.15 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him/her to proceed with the WORK and establishing the date for commencement of the WORK.

1.16 OWNER - A public or quasi-public body or authority, corporation, association, partnership, or an individual for whom the WORK is to be performed.

1.17 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.18 RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

1.19 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.20 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.21 SUBCONTRACTOR - An individual, firm, or corporation having a direct contract with CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.22 SUBSTANTIAL COMPLETION - That date certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

1.23 SUPPLEMENTAL GENERAL CONDITIONS - Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

1.24 SUPPLIER - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.25 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated in the PROJECT.

1.26 WRITTEN NOTICE - Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address, or delivered in person to said party or their authorized representative on the WORK.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instructions thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress scheduled showing the order in which the CONTRACTOR proposes to carry on the WORK, including dates at which the various parts of the WORK will be started, estimated date of completion of each part and, as applicable:

3.2.1 The dates at which special detail drawings will be required; and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

3.3 The CONTRACTOR shall also submit a schedule of payments that the CONTRACTOR anticipates will be earned during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the CONTRACTOR after discovery or such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidence by a CHANGE ORDER.

5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring the SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies, and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5 Materials, supplies, or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the CONTRACTOR.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide at the CONTRACTOR'S expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

7.5 Inspections, tests, or approvals by the engineer or others shall not relieve the CONTRACTOR from the obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ENGINEER and the ENGINEER'S representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records or personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for the ENGINEER'S observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, if, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article, or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue numbers, it shall be understood that this is referenced for the purpose of defining the

performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 The CONTRACTOR shall pay all applicable royalties and license fees, and shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or product of a particular manufacturer or manufacturers is specified, however, if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, the CONTRACTOR shall be responsible for such loss unless the CONTRACTOR promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pipe locations and other working points, lines, elevations and cut sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, shall be charged with the resulting expense and shall be responsible for any mistake that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, the CONTRACTOR shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY, AND PERSONS

11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR will take all necessary precautions for the safety of, will provide the necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The CONTRACTOR will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone of whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER, of the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instructions or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. The CONTRACTOR will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2 The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles the CONTRACTOR to a change in CONTRACT PRICE or TIME, or both, in which event the CONTRACTOR shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

- a. Unit prices previously approved.
- b. An agreed lump sum.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1 The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

15.4.1 To any preference, priority or allocation order duly issued by the OWNER.

15.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

15.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and reexecute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER by WRITTEN NOTICE of:

17.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

17.2 The OWNER shall promptly investigate the conditions, and if it is found that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless the required WRITTEN NOTICE has been given; provided that the OWNER may, if the OWNER determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION, AND DELAY

18.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

18.2 If the CONTRACTOR is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of its creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of its property, or if CONTRACTOR files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or disregards the authority of the ENGINEER,

or otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and its surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method the OWNER may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the CONTRACT. In such case the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER terminate the CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to the OWNER and the ENGINEER stop the WORK until paid all amounts then due, in which event and upon resumption of the WORK CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. PAYMENT TO CONTRACTOR

19.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of

materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect the OWNER'S interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing approval of payment, and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing the reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retainage. The retainage shall be an amount equal to 10% of said estimate until 50% of the work has been completed. At 50% completion, further partial payments shall be made in full to the CONTRACTOR and no additional amounts may be retained unless the ENGINEER certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the CONTRACTOR. At 50% completion or any time thereafter when the progress of the WORK is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 10% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the CONTRACTOR. When the WORK has been substantially completed except for WORK which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the OWNER are valid reasons for noncompletion, the OWNER may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the WORK still to be completed.

19.2 The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

19.4 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demand of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and

parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, the CONTRACTOR'S Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or its sureties from any obligations under the CONTRACT DOCUMENTS or the Performance and Payment BONDS.

21. INSURANCE

21.1 The CONTRACTOR shall purchase and maintain such insurance as will protect it from claims set forth below which may arise out of, or result from, the CONTRACTOR'S execution of the WORK, whether such execution be by the CONTRACTOR, any SUBCONTRACTOR, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

21.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts;

21.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of employees;

21.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than employees;

21.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

21.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

21.2 Certificates of Insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be cancelled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER.

21.3 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, Liability insurance as hereinafter specified:

21.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting the CONTRACTOR from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by the CONTRACTOR or by any SUBCONTRACTOR employed by the CONTRACTOR or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR employed by the CONTRACTOR. Insurance shall be written with a limit of liability of not less than \$500,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than \$500,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than \$200,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$200,000 aggregate for any such damage sustained by two or more persons in any one accident.

21.3.2 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

21.4 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the WORK is performed, Workmen's Compensation Insurance, including occupational disease provisions, for all of the CONTRACTOR'S employees at the site of the PROJECT and in case any WORK is sublet; the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of its employees not otherwise protected.

21.5 The CONTRACTOR shall secure, if applicable, "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the OWNER. The policy shall name as the insured the CONTRACTOR, and the OWNER.

22. CONTRACT SECURITY

22.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a Performance BOND and a Payment BOND in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

23.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of any right, title or interest therein, or any obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

24.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, its agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. SEPARATE CONTRACTS

25.1 The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTOR'S reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate the WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT or the OWNER may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTOR'S who are parties to such CONTRACTS (or the OWNER, if the OWNER is performing the additional WORK) reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate the WORK with theirs.

25.3 If the performance of additional WORK by other CONTRACTOR'S or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves it in additional expense or entitles it to an extension of the CONTRACT TIME, the CONTRACTOR may make a claim thereof as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of its SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by it.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and give the CONTRACTOR the same power as regards terminating any Subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5 Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR and the OWNER.

27. ENGINEER'S AUTHORITY

27.1 The ENGINEER shall act as the OWNER'S representative during the construction period, shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed, and shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship, and execution of the WORK. Inspections may be at the factory or fabrication plant of the source of material supply.

27.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

27.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

28.3 The CONTRACTOR shall provide at its own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTEE

29.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of the damage of other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

30. ARBITRATION BY MUTUAL AGREEMENT

30.1 All claims, disputes, and other matters in question arising out of, or relating to, the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by the making an acceptance of final payment as provided by

Section 20, may be decided by arbitration if the parties mutually agree. Any agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgement may be entered upon it in any court having jurisdiction thereof.

30.2 Notice of the request for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and a copy shall be filed with the ENGINEER. Request for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.

30.3 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

31. TAXES

31.1 The CONTRACTOR will pay all sales, consumer, use, and other similar taxes required by the laws of the place where the WORK is performed.

32. ENVIRONMENTAL REQUIREMENTS (Added 09-16-92, PN 191.)

The CONTRACTOR, when constructing a project involving trenching and/or other related earth excavation, shall comply with the following environmental constraints.

32.1 WETLANDS - The CONTRACTOR, when disposing of excess, spoil, or other construction materials on public or private property, WILL NOT FILL IN or otherwise CONVERT WETLANDS.

32.2 FLOODPLAINS - The CONTRACTOR, when disposing of excess, spoil, or other construction materials on public or private property, WILL NOT FILL IN or otherwise CONVERT 100 YEAR FLOODPLAIN areas delineated on the latest FEMA Floodplain Maps.

32.3 HISTORIC PRESERVATION - Any excavation by the Contractor that uncovers an historical or archaeological artifact shall be immediately reported to the PROJECT ENGINEER and a representative of the OWNER. Construction shall be temporarily halted pending the notification process and further directions issued by the OWNER after consultation with the State Historic Preservation Officer (SHPO).

32.4 ENDANGERED SPECIES - The CONTRACTOR shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of the CONTRACTOR, the CONTRACTOR will immediately report this evidence to the PROJECT ENGINEER and a representative of the OWNER. Construction shall be temporarily halted pending the notification process and further directions issued by the OWNER after consultation with the U.S. Fish and Wildlife Service.

PART 4

SUPPLEMENTAL GENERAL CONDITIONS

(NOT APPLICABLE)

PART 5

GENERAL CONSTRUCTION SPECIFICATIONS

PART 5

GENERAL CONSTRUCTION SPECIFICATIONS

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PART 5

GENERAL CONSTRUCTION SPECIFICATIONS

1. Foreword

The work specified to be done by the Contractor in the following sections under the "General Construction Specifications" is to be done at the expense of the Contractor and will not be measured in determining quantities for payment unless otherwise specified.

The unit and lump sum prices stated in the Contract hereto attached to be paid for work under the respective Items shall be full compensation for all work set forth herein under these General Construction Specifications.

2. Temporary Toilet Accommodations

The Contractor shall furnish, install and maintain ample sanitary facilities for the workmen; toilets shall be placed at the time work starts. These temporary toilet facilities shall be placed and maintained as required by the local health ordinances. He shall provide the necessary temporary enclosures to accommodate the toilets. The toilets shall be maintained in a sanitary condition and contents removed from premises as often as required.

3. Noise Prevention

The Contractor shall eliminate noise to as great an extent as possible at all times. Air compressors shall be equipped with silencers and the exhausts of all gasoline motors and other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools special precautions shall be taken to avoid noise and other nuisance, and the Contractor shall require strict observance of all pertinent ordinances and regulations. Blasting, in such locations, shall be done with reduced charges.

4. Dust Prevention

The Contractor shall apply an approved dust preventative as necessary to avoid and eliminate dust complaints from nearby residents, the cost of which shall be included in the prices bid for the various parts of the work.

5. Smoke Prevention

A strict compliance with all ordinances regulating the production and emission of smoke will be required and the Contractor shall accept full responsibility for all damage that may occur to property as a result of negligence in providing required control.

The Contractor will be held responsible for damage to any structures on the site due to emission of smoke and steam from his plant.

6. Temporary Heat

The Contractor shall provide such temporary heat as may be required to carry out all portions of the work and to prevent damage due to cold weather.

The Contractor shall, at his own expense, furnish, install, connect, operate and maintain all required temporary heating equipment, of an approved type, either gas or oil fired, with automatic safety devices and controls; properly vented to the outside of the building. He shall furnish and pay for all fuel, labor and material in connection with this temporary service.

The Contractor shall be responsible for all damage due to his failure to maintain required temperatures for any phase of construction, or improper use of equipment, and shall make good any damages which may result both direct and contingent.

7. Temporary Light and Electrical Power

The Contractor shall arrange and pay for separate temporary service necessary to provide temporary electric power used during construction and temporary electric lighting for all portions of the work. This cost includes any deposit(s) required on meters.

The Contractor shall make all necessary temporary electrical power installations, arrange for its distribution, continue its service throughout and remove same at the completion of the project. The Contractor shall pay for all costs incidental to installation and distribution, providing all necessary labor and materials.

The Contractor shall also provide continuous and adequate lighting meeting OSHA Standards for all phases of the project.

The temporary power service shall consist of a minimum size of one (1) 100 ampere fused NEMA 4 raintight switch rated for 115/230 volt, 1-phase, 3-wire. From the fused switch a 100 ampere 3 wire feeders is to run to a fused temporary distribution panel located either on a temporary pole and all power and lighting circuits taken from this panel. Temporary power lines shall provide 120 volt, 20 amp. receptacles within 50 feet of any portion of the construction. All elements of the temporary electrical power shall conform to the NEC, Life Safety Code 101 and OSHA regulations.

8. Temporary Water

It shall be the Contractor's responsibility to obtain and pay for all water used in the construction progress. The Contractor may arrange for his water supply through the local water company or through any other means at this disposal.

9. Cutting, Fitting and Patching

The Contractor shall make all connections to existing facilities and shall do all cutting, fitting and/or patching of the existing pipes or work of other Contractors in order to make the several parts fit together as shown or reasonably implied by the plans and specifications.

Any damages caused by negligent or ill timed work shall be at the expense of the Contractor.

The Contractor shall not endanger any work by cutting, digging or otherwise, and shall not cut or alter the work of any other contractor without the consent of the Engineer or the Owner's authorized representative.

10. Cleaning Up

The Contractor shall at all times keep the premises and haul roads free from accumulations of waste material, debris, rubbish, scrap, etc. caused by his employees or construction operations. Upon completion of the work, he shall systematically clean and make any needed repairs of structures; remove all equipment, tools and surplus materials; leave structures and roads "broom clean", or its equivalent, and the premises in a neat and clean condition.

11. Engineer's and/or Inspector's Responsibility with Respect to OSHA

The Engineer's and/or Inspector's in the performance of their duties shall not be responsible for the initiation or compliance of the safety of construction methods or procedures unless in his opinion it concerns permanent installations or permanent equipment. The Engineers and/or Inspectors shall not be held responsible for the initiation or enforcement of any OSHA Standards. The Engineer's and/or Inspector's responsibility, herein, lies solely in the design and inspection of permanent structures and permanently installed equipment.

12. Buoyant Forces and Dewatering

Due to the possibility of a high ground water table within the limits of the project, all utilities and structures may be subjected to a buoyant force during construction. The Contractor shall be responsible for any and all damages due to flotation prior to final acceptance of the work.

The Contractor shall assume all responsibility for claims resulting from damage to any land, wells, structures or improvements due to his dewatering operations.

13. As Built Drawings

The Contractor shall keep one (1) copy of all project specifications, plans, addenda, modifications, supplemental drawings, shop drawings and change orders at the project site in good order and annotated to show all changes made during the construction process. In addition, the Contractor shall keep one (1) set of "As-Built Drawings" for the project. These As-Built drawings will show all final elevations, all final dimensions and sizes for pipes and structures, and all other information as necessary to constitute As-Built records. In addition, these As-Built Drawings shall show pertinent information on all existing structures and utilities encountered during construction. These documents shall be kept daily by the Contractor and routinely checked by the Inspector for completeness and accuracy based on the Inspector's daily records and notes. It will be the Contractor's responsibility to furnish any and all information lost due to the Contractor's loss of these record drawings. In addition to other Contract requirements, retainage will be partially based on the Contractor's ability to maintain good As-Built records, as determined by the Engineer. Upon completion of the project or beneficial occupancy, whichever occurs first, these record "As-Built" drawings together with any other annotated supplemental plans, drawings, sketches, etc. shall be delivered to the Inspector for his final review and approval. If approved, the documents will be delivered to the Engineer for the Owner's record. If disapproved, they will be returned to the Contractor for corrections, as necessary.

14. Shop Drawings

Unless otherwise directed, the number of shop drawings to be submitted by the Contractor for the Engineer's approval shall be six (6), which upon approval will be distributed as follows: three to be returned to Contractor and one each for Engineer's office, field Representative, and Owner.

15. Plan Notes

Where notes on the plans indicate that certain work, material and equipment is to be furnished as part of the work under a specified item number, and the work, material and equipment is not included in the specifications; this work, material and equipment shall be included as though it were actually written in the specifications.

16. Field Office Not Applicable

17. Easements

A. Rights in Easements

The Contractor has the right, during construction to use the property shown as Easement and Temporary Construction Easement and the right of ingress and egress to and from these easements for construction. However, the Contractor, prior to exercising this right, shall obtain permission of the landowner to travel over a mutually agreeable route.

Furthermore, the Contractor shall assume full responsibility for claims resulting from damage to any land or improvements used for ingress and egress to such easements.

It shall also be his responsibility to obtain, in writing, any additional rights he may require over the remaining property for his construction.

B. Work in Easements

All work in easements shall be performed in accordance with the Specifications and the following special requirements:

The Contractor shall notify each property owner of his schedule to work in the easement on their property before he enters upon their property.

In the event the Contractor damages or destroys any septic tanks and/or laterals, sand filters, and dry wells as the result of his operations on private property, he shall handle the flow immediately, and thereafter until they are restored, and restore them to their original condition or as directed by the Engineer.

As a part of the project, the Owner has acquired certain temporary (construction) easements. The Contractor is responsible for replacing trees and/or shrubs damaged by him during construction at his own expense.

18. Construction Schedules

The Construction Schedule to be supplied by the Contractor per Section 3 of the General Conditions shall be of the bar chart type and containing the information per the General Conditions. The Construction Schedule shall be adjusted monthly, as necessary, to reflect current conditions. The Contractor shall request any increases in time due to abnormal weather conditions, strikes, etc. on a monthly basis and a time extension change order shall be processed accordingly.

The Construction Schedule should show a completion date that meets the constructions time allotted by the Contract Documents.

19. Notification by Contractor Prior to Construction

Sufficient notice shall be given by the Contractor to all utilities and property owners whose pipes, poles, tracks, wires, conduits or other structure may be affected by the work in order that they may protect, remove, adjust or rebuild them, or take such measures as they may desire to minimize inconvenience. He shall notify the local fire and law agencies twenty-four (24) hours in advance of the temporary blocking of any street. He shall also notify any effected water works utility and receive its authorized representative's approval before cutting into existing mains or shutting off main line services, except in case of emergency.

20. Traffic Control

The Contractor may close streets or roads to through traffic for minimum periods of time if approved by the appropriate authority and with proper notice to local occupants of all premises, police and fire protection authorities and other public authorities as applicable. The Contractor shall so schedule this work that this time is minimum and shall, whenever possible, make suitable provisions for access by local residents, school buses, police and fire emergency vehicles and mail delivery vehicles. The Contractor shall keep fire hydrants and other public utility valves accessible at all times.

At street or road crossings where the Contractor is permitted to open cut the trench, the crossing shall be completed, cleaned up, temporary pavement in place, and open to traffic within twenty-four (24) hours from the time the street or road is closed to through traffic, unless specific approval is received from the authority having jurisdiction, for a longer period.

When it is required that a street or road be closed to traffic, the Contractor shall furnish, erect and maintain barricades, suitable and sufficient red lights and other lights or reflecting material at the limits of the Project.

Where side streets intersect and at other points of public access to the project, the Contractor shall furnish, erect and maintain advance warning signs and barricades to direct traffic from closed sections.

The Contractor shall furnish, erect and maintain detour marking signs on temporary routes, except where same may be furnished by the State or County Highway Departments.

Throughout construction, the Contractor shall furnish, erect and maintain such lights, signs and barricades as may be required for the protection of any local traffic permitted on the roadway.

Where the improvement is to be accomplished with traffic maintained, the Contractor shall furnish, erect and maintain lights, signs, barricades, temporary guard rails and other traffic control devices, watchmen and flagmen as may be necessary to maintain safe traffic conditions.

21. Safety and Health Requirements

The successful bidder shall be responsible for all obligations prescribed as employer obligations under Chapter XVII of Title 29, Code of Federal Regulations for Construction, OSHA (PL 91-596) and the Contract Work Hours and Safety Standards (PL 91-54).

22. Permits

The Contractor shall provide and display any and all Permits required by Federal, State, County, Township, and/or Conservation Corporation prior to the start of construction.

PART 6

WORKMANSHIP AND MATERIALS

PART 6

WORKMANSHIP AND MATERIALS SPECIFICATIONS

LAKE SHAFER - LAKE ENHANCEMENT PROJECT

AREA 1: HONEY CREEK

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WORKMANSHIP AND MATERIALS SPECIFICATIONS

(SECTION WM 1)

GENERAL

The following specifications for Workmanship and Materials are of general application, and are to be used with the Detailed Specifications and drawings as far as applicable.

The Sections of the Workmanship and Materials Specifications shall accompany or be attached to each set of the Detailed Specifications. Additional Sections of Workmanship and Materials Specifications, other than those listed, may be included as a part of the contract documents attached to the listed Sections.

Materials for which no detailed specifications are given herein or under the Detailed Specifications shall in general conform to the physical characteristics and methods of treatment as set forth in the latest specifications of the American Society for Testing Materials insofar as they may apply, and shall be of the quality and character best adapted to the purpose for which they are to be used. No material shall be used for any purpose unless the material has previously been in use for a like purpose for a sufficient length of time to demonstrate the materials' satisfactory use.

All materials and equipment to be provided by the Contractor under this contract shall be new, unless otherwise specified. Any equipment offered shall be new and of a make and type which can be shown to have operated satisfactorily and continually in actual service for a sufficient length of time to demonstrate the equipment's success for the purpose for which the equipment is to be used.

(SECTION WM 2)

EXCAVATION

Description

The Contractor shall make all earth excavations required, to the widths and depths necessary for proper construction (and only to such widths and depths), for constructing according to the plans, all structures included in this contract. Earth shall mean all kinds of materials, wet and/or dry, excavated, or which are to be excavated, including rock, shale, hardpan, muck, quicksand, etc., unless provisions are made elsewhere in the contract documents for specified soil types.

Excavation shall include clearing the site for the work; the loosening, loading, removing, transporting, and disposing of all materials, wet or dry, necessary to be removed for purposes of construction; all sheeting and bracing; all draining, dewatering and pumping; backfilling of trenches, excavations and pits; earth borrow; the supporting of the excavations and structures (new and existing) above and below ground; the handling of water; and all incidental work.

General

Prior to commencing construction operations, the Contractor shall make all the provisions necessary to assure the protection of all existing improvements, both public and private. He shall protect trees, shrubs, plantings and grassed areas and shall make provisions for maintaining public travel in an acceptable manner.

Clearing

Preparatory to excavation, the site of all open cut excavations, embankments and fills shall be first cleared of obstructions and existing facilities (except those which must remain temporarily or permanently in service). On all public or private property where grants or easements have been obtained, and on the property of the Owner, the Contractor shall remove and keep separate the topsoil, and shall carefully replace it after the backfilling is completed.

Pavement Cutting

Prior to excavating paved areas all excavation edges falling within the pavement shall be saw cut in a neat straight manner. Cutting shall be performed with a saw designed specifically for this purpose. The cut shall penetrate the entire pavement thickness where possible. If the existing pavement is more than 6 inches thick then a cut of not less than 6 inch depth shall be made. Sawing equipment shall be submitted to the Engineer for approval before initial use. When the approved cutting equipment makes a cut more than 1" wide the cutting shall precede the excavation no more than one block or 400 feet which ever is less. If pavement cuts (those less than 1 inch wide) are made in streets which are reopened to traffic prior to excavation then the cuts shall be thoroughly filled with sand and maintained full until the excavation is performed.

Protection of Existing Improvements

Before any excavation is started, adequate protection shall be provided for all lawns, trees, shrubs, landscape work, fences, sidewalks, hydrants, utility poles, street, alley and driveway paving, curbs, storm sewers, ditches, headwalls, catch basins, surface inlets and all other improvements that are to remain in place. Such protection shall be provided as long as necessary to prevent damage from the Contractor's operations. Shrubs, bushes, small trees and flowers, which have to be removed to permit excavation for the project, shall be protected and replanted or replaced when the backfill is complete unless otherwise directed by the Engineer.

The Contractor shall exercise every precaution to prevent damage to property within and outside the immediate vicinity of the work. He shall remove all debris and rock from the site and restore the ground surfaces, replace or repair all driveways, buildings, fences, retaining walls, culverts, drains, paving, sidewalks, etc., which are removed or damaged during construction.

Repair, restoration or replacement of any improvements damaged or removed outside of the work to be performed shall be the obligation of the Contractor at no additional cost to the Owner.

Protection of Trees and Shrubs

No existing trees or shrubs in street Rights-of-Way and easements shall be damaged or destroyed. Where branches of trees or shrubs interfere with the Contractor's operations, they shall be protected by tying back wherever possible. No limbs or branches shall be cut. If his operations will not permit saving certain trees, the Contractor shall be wholly responsible for satisfying all claims for restoration or restitution resulting from their damage or removal.

If small trees and shrubs are moved or pruned to permit more working space pruning shall be done in accordance with Home and Garden Bulletin No. 83, U.S. Department of Agriculture, "Pruning Shade Trees and Repairing Their Injuries." However, the Contractor shall obtain, in writing, the property owner's permission to move or prune trees or shrubs on his property.

Trees and shrubs damaged by the Contractor's operation shall be repaired in accordance with said Bulletin No. 83.

Payment for protecting trees and shrubs shall be the obligation of the Contractor at no additional cost to the Owner.

Maintenance of Public Travel

The CONTRACTOR shall carry on the WORK in a manner which will cause a minimum of interruption to traffic, and may close to through travel not more than two (2) consecutive blocks, including the cross street intersected. Where traffic must cross open trenches, the CONTRACTOR shall provide suitable bridges to street intersections and driveways. The CONTRACTOR shall post suitable signs indicating that a street is closed and necessary detour signs for the proper maintenance of traffic. Prior to closing of any streets the CONTRACTOR shall notify responsible municipal authorities.

Utility Interruption

The CONTRACTOR shall proceed with caution in the excavation and preparation of the trench or pit so that the exact location of underground structures may be determined. Prior to proceeding with trench excavation the CONTRACTOR shall contact all utility companies in the area to aid in locating their underground services.

The CONTRACTOR shall take all reasonable precautions against damage to existing utilities. However, in the event of a break in an existing water main, gas main, sewer or underground cable, he shall immediately notify the responsible official of the organization operating the utility interrupted. The CONTRACTOR shall lend all possible assistance in restoring services and shall assume all costs, charges, or claims connected with the interruption and repair of such services.

Construction in Easements

In easements across private property, the CONTRACTOR shall confine all operations in the easement area and shall be responsible and liable for all damage outside of the easement area. Trees, fences, shrubbery or other types of surface improvements located in easements will require protection during construction. Precautions shall be taken by adequate sheeting or other approved method to prevent any cave-in or subsidence beyond the easement limits or damage to improvements within the easement. In general, the easement area is intended to provide reasonable access and working area for efficient operation by the CONTRACTOR. Where easement space for efficient operation is not provided, the CONTRACTOR shall be responsible for organizing his operations to perform within the restrictions shown on the plans. When requested, the OWNER shall furnish the CONTRACTOR a copy of the construction easements. Anytime the CONTRACTOR has to work outside of the easement area, he must obtain written permission from the property owner and furnish the ENGINEER with a copy.

Drainage

The Contractor shall make provisions for handling all flows in existing creeks, ditches, sewers and trenches by pipes, flumes or other approved methods at all times when his operations would, in any way, interfere with the natural functioning of said creeks, ditches, sewers and drains. The Contractor shall at all times during construction provide and maintain sufficient equipment for the disposal of all water which enters the excavation, both in open cut trenches and in tunnels, to render such excavation firm and dry, until the structures to be built thereon are completed.

Pipe underdrains, well point systems, deep well pumps or other suitable equipment and methods shall be used to keep all excavations firm and dry, at no additional cost to the Owner unless otherwise provided in the Proposal.

Disposal of Unsuitable Materials

Excavated materials which are either surplus and not required or are unsuitable for backfilling shall be removed from the site of operations as soon as excavated. All excavated materials so removed shall be disposed of, at no additional cost to the Owner, on privately owned property for which the Contractor has made prior arrangements. The Contractor is responsible for the restoration of areas within Public Right-of-Ways bordering properties for which the Contractor has a dump permit or release.

The Contractor is to provide the Engineer with a copy of the said permit, stating the condition in which the Property Owner will accept the spoil materials.

Storage of Suitable Materials

Excavated materials suitable and required for immediate backfill, shall be stored in neat piles adjacent to the excavation in a manner so as to interfere as little as possible with traffic, but shall not be placed at such heights above or closeness to the sidewalls of the excavation to endanger such operations due to slides or cave-ins. Fire hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, or other utility controls within Right-of-Ways shall be left unobstructed and accessible until the WORK is completed.

Excavated materials suitable for use as backfill, fill and embankments but not needed immediately shall be transported to a location approved by the Engineer and stored at the contractors expense. Storage shall be on the owners property provided the site offers sufficient room without hindering the Work or the normal operation of the Owner's facilities. All weather access must be maintained to all operating facilities on the site at no additional expense to the Owner. Gutters and catch basins shall be kept clear or other satisfactory provisions made for drainage. Natural watercourses shall not be obstructed.

Open Cut Excavation

Open cut excavation, either in earth or rock, shall be safely supported and of sufficient width and depth (and only to such width and depth) to provide adequate room for the construction or installation of the work to the lines, grades and dimensions shown on the Plans.

Trench Dimensions

The bottom width of the trench at and below the top of the pipe and inside the sheeting and bracing, if used, shall not exceed the recommendations as contained in the applicable ASTM Standard for the pipe being used.

Trench sheeting and bracing or a trench shield or box shall be used as required by the rules and regulations of OSHA. The bottom of the trench shall still meet the above standards.

If the trench widths are exceeded without the written permission of the Engineer, the pipe shall be installed with a concrete cradle or with concrete encasement or other ASTM approved methods as approved by the Engineer and at no additional cost to the Owner.

Excavations With Sloping Sides, Limited

The Contractor may, at his option, where working conditions and right of way permit (as determined by the Engineer), excavate pipe line trenches and pits for structures with sloping sides, but with the following limitations:

- (1) In general, only braces and vertical trenches will be permitted in traveled streets, alleys, narrow easements and for pit excavations more than 10 feet deep.

- (2) Where pipe line trenches with sloping sides are permitted, the slopes shall not extend below the top of the pipe, and trench excavations below this point shall be made with near-vertical sides with widths not exceeding those specified herein before.
- (3) Slopes shall conform to all OSHA regulations.
- (4) When pit excavations with sloping sides are permitted, the Contractor shall assume full responsibility for all costs incurred to backfill the larger excavation in accordance with the Contract Documents including furnishing materials if adequate quantities of suitable materials are not available from those excavated on the site.

Sheeting and Bracing

The Contractor shall furnish, place and maintain adequate sheeting and bracing as may be required to support the sides of the excavation and prevent any movements of earth which could, in any way; diminish the width of the excavation to less than that necessary for proper construction; cause damage to the pipe or structure being constructed or to adjacent structures, utilities, pavements or walks; cause injury to workmen or others through movement of the adjacent earth banks; or to otherwise damage or delay the work.

- A. Materials: Sheeting may be of wood or steel and shall be of adequate strength for the excavation, subject to the approval of the Engineer, who shall have the right to order the Contractor to furnish heavier sheeting than that being used or proposed to be used by the Contractor, at no additional cost to the Owner.
- B. Additional Supports: If the Engineer is of the opinion that sufficient or proper supports have not been provided at any location, he may order additional supports installed at the expense of the Contractor, and the compliance with such orders shall not relieve or release the Contractor from his responsibility for adequately supporting the sides of the excavation.
- C. Methods: Wherever possible, the sheeting and bracing shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Care shall be taken to prevent voids outside the sheeting; but, if voids develop, they shall be immediately filled with selected sandy materials and compacted by flushing and jetting with water or as directed by the Engineer. Where drop inlets or stacks are constructed, the excavation shall be offset, as required, without additional compensation.
- D. Left in Place: The engineer may order sheeting and bracing to be left in place at locations other than shown by the Plans. Sheeting left in place may be ordered to be cut off at any specified elevation, but in no case shall it be left in the ground above an elevation eighteen (18) inches below the existing or proposed surface of the ground. All voids created by the cutting off of the sheeting to be left in place shall be immediately filled with selected sandy materials and compacted by flushing and jetting with water or as directed by the Engineer.

Sheeting and bracing left in place in open cut trenches as shown on the Plans or as ordered by the Engineer shall be paid for only in accordance with applicable provisions of the Contract Documents.

If the Contractor elects not to remove certain sheeting and bracing, he will not be paid additionally for such sheeting and bracing left in place.

- E. Not Left In Place: All sheeting and bracing not to be left in place shall be carefully removed (after the backfill is complete) so as not to endanger the pipes and other structures. All voids created by withdrawal of the sheeting shall be immediately filled with selected sandy materials and compacted by flushing and jetting with water or as approved by the Engineer.
- F. All sheeting and shoring is to be done in accordance with the Occupational Safety and Health Standards 40 CFR Part 1926 Subpart P, Excavation.

Earth Excavation

Earth materials shall be excavated so that the open cuts conform with the lines, grades and dimensions shown on the drawings.

- A. Unsuitable Foundation: When the bottom of the excavation is unsuitable as a foundation, it shall be excavated below grade and then refilled with concrete or crushed stone to the grade as the Engineer may direct. The crushed stone refill shall be mechanically compacted in six (6) inch layers or as directed by the Engineer. Such authorized work shall be paid for as set forth under the appropriate Item of the Proposal or the Change Order. This provision shall not relieve the Contractor of his obligation to dewater the excavation at no additional expense to the Owner.
- B. Unauthorized Excavation: Unauthorized excavation below grade shall be filled with crushed stone or concrete and compacted as ordered and directed by the Engineer at no additional cost to the Owner.
- C. Excavated Earth For Backfill: Excavated earth materials may be used for backfill subject to the approval of the Engineer, and the Contract Documents. Such material may be used only where its class is allowed. For example: Excavated material conforming to "Class II" description may be used where "Class II" material is required. When the Contract provides a unit price payment for classified backfill or fill material, excavated materials may qualify for such payment only if it is transported to another location for installation or temporary storage. The Contractor shall not transport the material solely to qualify it for such payments.

Rock Excavation

Rock shall be defined as follows: Boulders measuring one-half (½) cubic yard or more in volume; rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits so firmly cemented that they possess the characteristics of solid rock that cannot be removed without systematic drilling and blasting; and concrete and masonry structures, except sidewalks and paving. Pockets or seams of earth or clay less than four (4) inches in thickness, occurring below or between solid ledges of rock, shall be considered rock.

When rock is encountered in open cut excavation, it shall be removed by drilling, blasting, digging or other approved methods so that open cut trenches conform with the lines, grades and dimensions shown on the Plans.

- A. Explosives: The Contractor shall comply with all Federal, State and Local laws, rules, regulations, insurance and ordinances governing the transportation, storage, use and permits for explosives.
- B. Description: Solid rock excavation shall consist of the necessary excavation and satisfactory disposal of all rock in place which can not be removed from its original position without the use of explosives, or with a modern power shovel of not less than three-quarter (3/4) cubic yard capacity, properly used, having adequate power and in good running condition, or other equivalent powered equipment. The excavation shall also include all loose stone or boulders necessary to be removed which have a volume of one-half (1/2) cubic yard or more. Boulders of less than one-half (1/2) cubic yard in volume shall not be classed as rock excavation.
- C. Safety Precautions: When blasting is required for the removal of rock, every precaution shall be used for the protection of persons and private and public property. Each blast shall be well covered with mats or other suitable means to confine the rock fragments within the excavation. At the discretion of the Engineer, he may order an evaluation survey of properties within the blasting zone. Only the minimum amounts of explosives shall be used; no excessive charges will be permitted. Except with written permission and approval of the Engineer, no blasting of rock will be permitted at nights or on Sundays.
- D. Blasting Methods: The method of blasting will be as determined by the Contractor, subject to the approval of the Engineer prior to construction. Blasting shall be performed at a safe distance ahead of the installation of the pipe and structures to prevent damage to them as the work progresses. Blasting of rock for property service connections, T-branches, Y-branches, and stubs shall be performed at the same time as the pipe trench blasting. The rock at the ends of all pipes, branches, stubs and property service connections, shall be shattered by continuing the drilling and blasting operations six (6) feet beyond the end of the pipe, branch, stub or property service connection.

Sufficient dynamite shall be used to shatter the rock for future excavation, as may be determined and ordered by the Engineer.

The blasting of rock under existing paving prior to uncovering the rock will be permitted, provided, the Contractor assumes full responsibility for all damage to the existing paving; however, the Owner reserves the right to require the uncovering of rock prior to blasting if blasting without uncovering proves unsatisfactory.

If the Contractor chooses to blast rock under paving without uncovering the rock, he shall immediately repair humps in the paving which create a traffic hazard, as determined by the Engineer; and, all distortions outside the limits of the trench caused by this method of blasting shall later be removed and replaced as part of the paving restoration, as directed by the Engineer. The Contractor is fully responsible for all damages that occur.

- E. Repairs of Damage: In case injury occurs to any portion of the work, or to the material surrounding or supporting the same, through blasting the Contractor at his own expense shall remove such injured work and shall rebuild said work and shall replace the material surrounding or supporting the same, or shall furnish such material and perform such work of repairs or replacements as are necessary for satisfactory restoration. Any damage

whatever to any existing structure due to blasting shall be promptly, completely and satisfactorily repaired by the Contractor at his own expense.

Boring and Jacking

Construction of the pipeline by boring and jacking methods will be permitted unless otherwise specified on the plans.

Backstop: The backstop shall be of sufficient strength and positioned to support the thrust of the boring equipment without incurring any vertical or horizontal displacement during such boring operations.

Guide Rails: The guide rails for the boring equipment may be of either timber or steel. They shall be laid accurately to line and grade and maintained in this position until completion of the boring operations.

Casing Pipe: Steel casing pipe shall be new, conform to ASTM A 139 and shall be of the size (diameter) shown on the plans. The lengths of pipe shall be welded as they are installed. Where lengths of casing pipe are joined during the boring operations, care shall be taken to insure that the proper line and grade is maintained.

The minimum wall thickness for casing pipes under highways, railroads and streams shall be 0.375 inches. Steel shall be Grade B under railroads and Grade A at all other locations.

Removal of Water

The Contractor shall at all times during construction provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavations or other parts of the work and shall keep said excavations dry until the structures to be built therein are completed. No masonry shall be laid in water nor shall water be allowed to rise over masonry, until the concrete and mortar have attained a sufficient and satisfactory set. In no event shall concrete be placed in water, nor shall water be allowed in the excavation, which may set up unequal pressures in the concrete, until the concrete has set at least twenty-four (24) hours and any danger of flotation has been removed.

In order to provide a dry foundation, the Contractor, if required by the Engineers, shall pre-drain all wet material (except hardpan or rock) by lowering the ground water to a depth of at least one (1) foot below the deepest point of subgrade. The work of pre-draining shall be done by the use of a well point system, or by any other method approved by the Engineer that will permit the construction work to be carried on under dry foundation conditions. All discharge water shall be piped to the nearest point of disposal in order to prevent such water from again entering the excavation. Any method or system that may be used to lower the ground water shall be kept in operation continuously unless otherwise permitted. The Engineer's approval of the proposed system shall not relieve the Contractor from the responsibility of providing and maintaining dry excavations as required.

The Contractor shall dispose of water from the work in a suitable manner without damage to adjacent property or piping. No water shall be drained into work built or under construction unless the consent of the Engineers is first obtained.

All removal and handling of water required to maintain dry trenches or other excavations for the construction of sewers, water mains, or other structures in the dry, shall be at the expense of the Contractor.

(SECTION WM 3)

BACKFILL FILLS AND EMBANKMENTS

Description

All trenches or excavations shall be backfilled to the original surface of the ground or such other grades as shown or directed. In general the backfilling shall be carried along as speedily as possible and as soon as the concrete, mortar, and/or other masonry work and pipe joints have sufficient strength to resist the imposed load without damage.

Backfill Materials

The following materials shall be used for backfill in accordance with and in the manner indicated by the requirements specified herein.

Class I - Angular, 6 to 40 mm (1/4 to 1 1/2 inch), graded stone such as crushed stone.

Class II - Coarse sands and gravel with maximum particle size of 40 mm (1 1/2 inch), including various grades of sands and gravel containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW and SP are included in this class.

Class III - Fine sand and clayey gravel including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil types GM, GC, SM and SC are included in this class.

Class IV - Silt, silty clays and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH and CL are included in this class. These materials are not recommended for bedding. This class shall also include any excavated material free from rock (3 inches and larger), concrete, roots, stumps, rubbish, frozen material and other similar articles whose presence in the backfill would cause excessive settlement.

Backfill of Trench Excavations for Pipes and Conduits

Bedding and Backfill materials samples shall be submitted to the Engineer prior to start of construction. Approved samples shall be kept at the Engineer's field office. Materials differing significantly from these samples shall not be used without written authorization from the Engineer.

Bedding

Rigid Pipe and Conduit Bedding

For purposes of this specification, rigid pipe and conduits shall include those made of steel, ductile iron, cast iron, concrete, VCP, PVC/ABS Truss and other materials as determined by the Engineer.

All rigid conduit and pipe shall be laid to the lines and grades shown on the plans, unless otherwise directed by the Engineer. All rigid conduit and pipe shall be bedded in compacted Class I or II material, placed on a flat trench bottom. The bedding shall have a minimum thickness of 4" or one-fourth (1/4) the outside pipe diameter below the pipe and shall extend halfway up the pipe

barrel at the sides. All material shall be placed in the trench in approximately six (6) inch layers. Each layer, shall be leveled and evenly distributed on both sides of the pipe so as not to disturb, displace or damage the pipe and shall be thoroughly compacted. When Class I or II materials is used compaction may be accomplished by hand or mechanical tamping or by "walking" the material in. Bedding from the halfway point on the pipe to a point twelve (12) inches above the top of the pipe shall be a Class I, II, III, or IV material placed in six (6) inch layers and thoroughly compacted to prevent settlement. Class III and IV material shall not be used when the trench is located in an area subject to vehicular traffic.

Flexible and Semirigid Conduit Bedding

For purposes of this specification, flexible and semirigid conduits and pipes shall include those made of PVC, PE, FRP, and other materials as determined by the Engineer.

All flexible and semirigid pipe shall be laid to the lines and grades shown on the plans, unless otherwise directed by the Engineer. All flexible and semirigid conduit shall be bedded in compacted Class I or Class II material, placed on a flat trench bottom. The bedding shall have a minimum 4" thickness or one-fourth (1/4) the outside pipe diameter below the pipe and shall extend to twelve (12) inches above the top of the pipe level the full width of the trench. All material shall be placed in the trench in a maximum of six (6) inch layers (before compaction). Each layer, shall be leveled and evenly distributed on both sides of the pipe so as not to disturb, displace or damage the pipe and shall be adequately compacted. When Class I materials are used compaction may be accomplished by hand or mechanical tamping or by "walking" the material in. When Class II materials are used compaction shall be accomplished only by hand or mechanical tamping to a minimum eighty-five percent (85%) Standard Proctor Density.

When flexible conduit installation represents more than 10% of the total base bid, the Pipe or conduit manufacturer shall examine the proposed bedding materials samples and certify the suitability of same for use with his product in accordance with these specifications. In the event the manufacturer recommends an alternate bedding procedure the Contractor shall include with his pipe submittal a complete cost evaluation for installing the bedding as recommended and as required by these specifications. All cost savings shall be given the Owner by adjusting the Contract amount accordingly by Change Order. More expensive procedures shall not be acceptable unless the Contractor agrees to bear all additional costs.

Backfill Above Pipe

Method A - Backfill in Areas Not Subject to Vehicular Traffic

For purposes of this specification, trenches shall be considered subject to vehicular traffic if all or any portion of the excavation is located within four (4) feet of a roadway or alley which is routinely traveled by powered vehicles. In the event of any question regarding the susceptibility of an area to traffic, the Engineer's decision shall govern.

The trench between a level twelve (12) inches above the top of the pipe and the ground surface shall be backfilled with Class I, II, III or IV materials, as described above, deposited with mechanical equipment in such a manner that it will "flow" onto the bedding and not free fall. The Contractor shall consolidate the backfill by the back and forth travel of a suitable roller, wheeled device or other similar heavy equipment until no further settlement is obtained. Heavy equipment shall not be used until there is a cover of not less than three (3) feet over the pipes. To assist in promoting maximum settlement, the surface of the trench shall be left in a slightly rounded condition.

Periodical dressing of the backfill in the trench to promote the drainage and safety conditions shall be made during the course of the contract as required or ordered by the Engineer.

Method B - Backfill in Areas Subject to Vehicular Traffic (Mechanical Compaction)

The trench between a level of twelve (12) inches above the top of the pipe and the surface, which are located in areas subject to or possibly subject to vehicular traffic, shall be backfilled with Class I or II materials, deposited in uniform horizontal layers of two (2) feet +/- six (6) inches. Each layer shall be thoroughly compacted by mechanical tamping utilizing a crane mounted hydraulic vibratory compactors. Each layer shall be thoroughly compacted before the next succeeding layer is placed. This procedure shall be followed where trench walls remain stable during compaction. If in the opinion of the Engineer and/or his representative (inspector), the trench walls become unstable during compaction, then the Engineer and/or his representative (inspector) may authorize the Contractor to push from the back of the trench the Class I or II material into the trench the full depth, not to exceed twenty (20) lineal feet horizontally along the trench bottom and compact using the vibratory compactor in two (2) foot diagonal lifts.

The crane mounted vibratory compactors shall be capable of producing 1900 cycles per minute and have a compaction plate with the minimum dimensions of twenty-three by thirty-one (23 x 31) inches. The compactor shall be similar to those as manufactured by Allied, Ho-Pac, or equal.

When Class I or II materials do not contain sufficient moisture to obtain proper compaction, in the opinion of the Engineer and/or his representative, it shall be moistened or wetted as directed by the Engineer and/or his representative.

Granular backfill materials shall terminate at a point below finished grade sufficient to allow placement of the permanent surface materials. For portions of the surface subject to vehicular traffic, the remaining trench shall be filled with compacted aggregate base material, shaped, graded and compacted with a ten (10) ton roller. Where the permanent surface is asphalt or concrete the aggregate base thickness shall be the specified thickness of the pavement material plus six (6) inches. Where temporary cold mixed asphalt pavement is specified the compacted aggregate materials shall be stopped at required grade to accommodate the temporary pavement. Where the permanent surface is compacted aggregate the layer shall be eight (8) inches thick. In either case, the Contractor shall maintain the surface daily until the permanent pavement is placed.

For portions of the trench surface not subject to traffic the backfill material shall end eight (8) inches below the finished grade. This eight (8) inch depth shall be filled with good top soil and seeded in accordance with these Specifications. Existing top soil and sod may be used if properly separated and preserved.

The compacted aggregate base materials shall conform with the Indiana State Highway Department Standard Specifications, latest edition, for compacted Aggregate Base. In the event that suitable aggregate material, which conforms to the above specification is obtainable from the trench excavations and can be satisfactorily segregated, the Contractor may elect to use the material in lieu of purchased materials.

Density testing of the above backfilled trenches shall be the responsibility of the Contractor and shall be performed at no additional cost to the Owner. Testing shall be performed by an approved commercial testing laboratory. All backfill placed under this Method B shall be tested in accordance with AASHTO-T-99. Density testing shall be performed immediately prior to permanent pavement replacement and after the upper level of the compacted aggregate base or temporary pavement is removed to allow paving. When backfill has been placed using vibratory compaction, testing shall

be made at the exposed surface one (1) time per location and not less than one (1) test per four hundred (400) feet. All test locations shall be determined by the Engineer. Should the results of the density test show a compaction of less than ninety-five percent (95%) Standard Proctor Density, the area(s) represented by such test shall be immediately recompacted using METHOD C as specified, and at no additional cost to the Owner.

Method C - Backfill in Areas Subject to Vehicular Traffic (Jetting and Watersoaking)

In lieu of the Mechanical Compaction described in Method B above, the Contractor may compact the Class I or II materials by jetting and watersoaking in the manner described below. Except for compaction procedures of the Class I or II materials, all provisions of Method B described above shall apply to this Method C. The trench compaction shall be started at the point of lowest elevation of the trench and work up along the trench. Jetting and watersoaking shall not begin until the trench has been backfilled to within eight (8) inches of the finished surface. Jetting and water soaking is not allowed when the groundwater table is above the spring line of the pipe.

The holes through which water is injected into the backfill shall be centered over the trench backfill and at longitudinal intervals of not more than six (6) feet. Additional holes shall be provided if deemed necessary by the Engineer to secure adequate settlement. All holes shall be jetted and shall be carried to a point one (1) foot above the top of the pipe. Drilling the holes by means of augers or other mechanical means will not be permitted. Care shall be taken in jetting so as to prevent contact with, or any disturbance of the pipe.

The water shall be injected at a pressure and rate just sufficient to sink the holes at a moderate rate. After a hole has been jetted to the required depth, the water shall continue to be injected until it begins to overflow the surface. The Contractor shall, at his own expense, bore test holes at such locations as the Engineer may designate in order to determine the effectiveness of the water soaking. An approved soil auger shall be used for boring test holes. As soon as the jetting and watersoaking has been completed, all holes shall be filled with soil and compacted. Surface depressions resulting from backfill subsidence caused by jetting and watersoaking shall be filled and recompacted by tamping or rolling to the satisfaction of the Engineer.

The Contractor shall provide all piping, fittings, etc., necessary to deliver the water along the site of the work and shall arrange with the Water Company for making the necessary taps and metering. All expenses incurred for installing the pipe and hose together with the cost of the water used shall be borne by the Contractor.

Temporary Surfaces Subject to Traffic

The Contractor shall open streets to traffic immediately after completing the backfill operation. He shall accomplish this by installing the compacted aggregate base immediately after granular backfill. When temporary asphalt pavement is required this shall also be installed immediately. The use of class II backfill as a temporary surface is specifically prohibited. When using Method C backfilling, the Contractor may elect to delay the jetting operation until just prior to installing the permanent pavement. This shall not relieve the Contractor from the responsibility of maintaining the temporary surface in accordance with these specifications.

Maintaining Trench Surfaces

All surface settlement of the backfill along trenches located beneath streets, roads, alleys, driveways and parking lots which are subject to traffic shall be kept filled level with or slightly above the original paved surface at all times with compacted aggregate base material until the permanent

pavement is satisfactorily restored. When temporary asphalt pavement is used, depressions and "pot holes" shall be promptly filled with the temporary asphalt material. Special attention shall be given by the Contractor to the timely and proper maintenance, leveling and grading of the surface of all backfilled trenches, especially those subject to traffic and especially following rains. The surface of streets, roads and alleys shall be maintained smooth and free of ruts and water trapping depressions by periodic power blading, scarifying; and/or filling settled areas, ruts, pockets, or holes with compacted aggregate base material or temporary asphalt where used.

As a dust preventive, the Contractor shall apply, at his expense, calcium chloride over the surface of the compacted aggregate base in such amounts and at such times as are necessary to avoid or eliminate dust complaints from nearby residents. In event of any question regarding the existence or nonexistence of a dust nuisance, the Engineer's decision on the matter will govern. The material used shall be Regular Flake Calcium Chloride having a minimum chemical content of Calcium Chloride of seventy-seven percent (77%). Unless otherwise specified or ordered by the Engineer, the rate of application shall be one and one half (1 ½) pounds per square yard of surface covered.

Wherever surface settlement is not important, unless otherwise specified or directed, the backfill shall be neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation. Just prior to the completion of all work under the contract, any surface settlement below original ground surface shall be refilled in a satisfactory manner, and reseeded as specified if required.

Backfill Around Structures

For purposes of this specification, structures shall include but not be limited to footings, foundations, basements, grade beams, vaults, capsules, manholes, ducts, tanks, bridges, inlets, headwalls, anchors, and etc. Items specifically excluded from this definition of "structures" are pipe, conduits and their appurtenances except those listed herein.

The material for backfill around structures shall meet the requirements of Class I, II or III backfill materials, as defined on page WM 3 (1 of 8) under the paragraph entitled "Backfill Materials". Material removed from the project site may be used as long as it meets this criteria. Materials classified as Class IV, clay balls, debris, topsoil, frozen or excessively wet or dry materials, weak soils or muck and other similar detrimental materials will not be put in place as backfill around structures.

All excavations shall be backfilled to the original surface of the ground or such other grade as shown on the plans or directed by the ENGINEER. The backfilling shall be carried along as speedily as possible and as soon as the concrete, mortar and/or other masonry work and pipe joints have sufficient strength to resist the imposed load without damage. All appurtenances and attachments to structure walls shall be made and any wall coatings shall be in place and cured prior to backfilling at that elevation.

Prior to backfilling, all formwork and construction debris will be removed. Any frozen or wet subsoil will be thawed or dried and compacted or removed prior to receiving backfill. During cold seasons, grades receiving backfill will be protected from frost during the work progress.

Begin backfill at the lowest elevation in the excavation. Place backfill in even, level layers. The thickness of the layer shall not exceed 75% of the compaction equipment manufacturer's rating for the equipment used when compacting the type of soil being placed for backfill, i.e. Class I, II and/or III.

Density tests will be made by the contractor, as directed by the Engineer, at no additional cost to the Owner. The tests are to be performed as described below and will be required as necessary to determine that uniform compaction throughout the depth of the lift has been achieved. Where backfill is required on both sides of structure or around the entire structure, backfill and compaction shall be done simultaneously on both sides or around the structure.

The compaction equipment used for compacting backfill around structures shall be submitted for approval of the Engineer. In general, the equipment will be approved for use upon demonstration that it is capable of compacting the soil to the required density without damaging adjacent structures and appurtenances. Tread mounted equipment shall not be considered effective compacting equipment.

The Contractor shall provide, when necessary, equipment and materials to moisten or aerate excessively wet or dry backfill to maintain optimum moisture content (+/- 2%) for the soil type being placed.

Rainfall and/or groundwater trapped in the excavation during backfill operations shall be pumped out by the Contractor. Excessively wet soil or soil which has eroded into the excavation shall be removed or excavated and recompacted prior to placing additional backfill material.

The in-place density obtained by the backfill operations will be measured by an Engineer approved independent testing laboratory obtained and paid for by the Contractor at no additional cost to the Owner. The percent compaction will be determined by dividing the density measurement by the maximum density for the soil type being tested. The maximum density will be determined by the standard proctor test, ASTM D698. Test reports shall indicate the location and elevation of the test. Density testing shall be made at frequent intervals along the backfill layer, at the surface and at mid-depth as determined by the Engineer. All backfill shall be compacted to at least 95% of maximum density and the top two feet of backfill under areas subject to vehicular traffic shall be compacted to 98% of maximum density.

Openings in structures to receive pipe shall be temporarily plugged or bulkheaded during backfill operations. Backfill shall proceed to an elevation level with the invert of the pipe. The pipe shall then be bedded and backfilled in accordance with the applicable Detailed Specification and Workmanship and Materials Specifications. Backfill of pipe not in areas subject to vehicular traffic shall be with Class I, II or III materials and in areas subject to vehicular traffic with Class I or II materials only.

General Fill Areas

In areas where general site fill material is required and is not addressed in other parts of this section, Class IV material shall be acceptable. For general fill areas, fill materials shall be spread in layers not to exceed 8 inches when in a loose condition and be compacted to the satisfaction of the engineer by grading equipment.

(SECTION WM 4)

RESTORATION OF SURFACES

General

Restoration of surfaces shall include the removal of the existing surface, the disposal of the surplus material and the construction of new surfaces and adjusting all new and existing structures for proper grade prior to paving as indicated on the plans and/or as specified in these Specifications.

Restoration of Paved Surfaces

Restoration

After all excavations within the limits of paved surfaces have been properly backfilled and compacted in accordance with Sections WM 2 and WM 3 of these Specifications, the paved surfaces shall be restored to a condition as good as or better than existed prior to the beginning of the work, in accordance with the following specifications.

State Paved Surfaces: Highways, streets and roads constructed and/or maintained by the Indiana State Highway Department, which are wholly or partially removed, damaged or disturbed by the Contractor's operations shall be restored to a condition as good as or better than existed prior to the beginning of the work. Such restoration shall be performed in accordance with the pertinent specifications and standards of the Indiana State Highway Department, as applicable.

Other Paved Surfaces: Streets, alleys, sidewalks, driveways, curbs and gutters, not constructed or maintained by the State Highway Department, but paved with asphalt, concrete, cinders, crushed stone, waterbound macadam, oil-bound macadam, or heterogenous paving materials, which are wholly or partially removed, damaged, or disturbed by the Contractor's operations, shall be restored with like or better materials, acceptable to the Engineer, to a condition as good as or better than existed prior to the beginning of the work, so that movement of traffic, both vehicular and pedestrian, through the restored way shall be as free, safe and unimpeded as before.

Temporary Surface

Temporary trench surfaces shall be installed and maintained in accordance with section WM 3 Backfill, Fills and Embankments of this specification. This temporary surface shall be maintained by the Contractor until the permanent pavement is placed. Before placing permanent pavement, all or parts of the temporary surface shall be removed, as necessary, and hauled from the site of the work.

Temporary Pavement Replacement

Trench surfaces of highly traveled streets and roads may be designated to receive a temporary pavement replacement of cold mixed bituminous pavement. This temporary pavement shall be of the thickness specified or shown on the plans and shall be surface mixture Class A or B prepared and placed in accordance with Section 406 - Cold Mixed Bituminous Pavement of the latest edition of the Indiana State Highway Department Specifications. Prime and tack coats shall not be required. All temporary pavement shall be maintained by the Contractor to proper grade so as not to impede the safe flow of traffic until the permanent pavement replacement is made.

Permanent Paving

Permanent paved surfaces shall be restored in accordance with the following requirements, unless otherwise set forth in the plans, the Special Provisions or Detailed Specifications; however, in all cases, the methods and materials of restoration shall meet the requirements of the Indiana State Highway Department, as applicable.

Class "B" Concrete Pavement

Existing local streets, roads, alleys, driveways and parking areas consisting of concrete pavement shall be restored according to the following requirements.

Areas subjected to excavation or damage by the Contractor are to be replaced as a whole. Sidewalks to be replaced in complete sections, streets and driveways as complete sections or replaced with sections that coincide with the original pattern, and to the Owner's and/or Engineer's satisfaction.

Prior to placing concrete, the existing edges are to be saw-cut in a neat straight manner, sub-base compacted, wetted down and edges swept clean. The use of flexible joint material is required as needed. All chunks of existing material larger than three by three (3 x 3) inches are to be removed.

Class "B" concrete pavement shall consist of a cast in place, layer of Class A concrete as described in Section WM 5 - Concrete of these specifications with one (1) layer of woven wire fabric (6 x 6 - W1.4 x W1.4) meeting ASTM Designation 497. Except where specified differently in the Detailed Specifications or shown differently on the Plans the concrete layer shall be six (6) inches thick. All rigid concrete pavement work and materials shall meet the latest specifications of the Indiana State Highway Department.

Class "C" Asphalt Pavement

Existing local streets and roads consisting of asphalt paving shall be restored with binder and surface of the thickness specified and as follows:

Areas subject to Class C asphalt pavement replacement shall have the existing edges (those created by cutting prior to excavation) re-cut in a neat straight manner as to remove irregularities and damaged areas. Manholes, service line trenches and existing valve areas are to be boxed out in a neat manner. All cuts shall be parallel or perpendicular to the trench. Curved or diagonal cuts shall not be allowed. All chunks of existing material larger than three by three (3 x 3) inches are to be removed.

The aggregate base course, including the previously placed temporary surface or pavement, shall have the upper portions removed to allow placement of the binder and surface. After the base is cutback, it shall be re-compacted with a ten (10) ton roller or other suitable equipment if approved by the Engineer. Care shall be taken to assure that not less than six (6) inches of compacted aggregate base remains below the permanent pavement.

The binder course(s) shall consist of compacted Hot Asphaltic Concrete, Type A, Size No. 9 as defined by the latest edition of the Indiana State Highway Specifications. Compaction shall be accomplished with suitable smooth wheel rollers. Where multiple binder courses are specified or shown on the plans each course shall be thoroughly compacted before placing the next layer.

Generally, conventional self-propelled rollers of not less than 10 tons gross weight shall be used. The Engineer may allow other specialized rollers for narrow trenches or lighter rollers with vibratory action. The Engineer shall consider alternate equipment only if Contractor requests same in writing and includes technical data on the specific equipment to be considered.

The quantity and thickness of binder courses required shall be as specified or shown in the Detailed Specifications or Plans. In absence of such direction one (1) course shall be required, two (2) inches in thickness.

The surface course shall consist of compacted Hot Asphaltic Concrete Surface Type A, (Size No. 11 or 12)' as defined by the latest edition of the Indiana State Highway Specifications and placed in the same manner as described above for binder. The surface thickness shall be as specified or shown in the Detailed Specifications or Plans. In absence of such direction the thickness shall be one (1) inch.

Class "D" Asphalt Pavement

Existing State highways consisting of asphalt paving shall be restored with base and surface of the thickness specified as follows.

Areas subject to Class D asphalt pavement replacement shall have the existing edges (those created by cutting prior to excavation) re-cut in a neat straight manner to remove irregularities and damaged areas. Manholes, service line trenches and existing valve areas are to be boxed out in a neat manner. All cuts shall be parallel or perpendicular to the trench. Curved or diagonal cuts shall not be allowed. All chunks of existing material larger than three by three (3 x 3) inches are to be removed. Upper portions of the previously installed compacted aggregate base including temporary surface or pavement shall be removed to allow placement of the base and surface. Care shall be taken to assure that not less than six (6) inches of compacted aggregate base remains below the pavement asphalt base.

The base course shall consist of four (4) - three (3) inch separately compacted layers of Bituminous Base (Size No. 4 or 5).

The surface course shall consist of one (1) inch of compacted Hot Asphaltic Concrete Surface (Size No. 11 or 12).

All Hot Asphaltic Concrete Binder and Surfaces Mixtures for Class "D" shall be prepared, placed, compacted, and finished in accordance with latest edition of the Indiana State Highway Department Specifications.

Double Chip and Seal

This work shall consist of two applications of bituminous material, each followed by an application of cover aggregate in accordance with these specifications.

Grade and roll the sub-base prior to application.

The first application shall consist of applying a liquid sealing asphalt at the rate of 0.50 gallons per square yard followed by application of aggregate (Size No. 8 or 9) at the rate of forty (40) pounds per square yard and rolled to seat the stone in the asphalt.

The second application shall consist of applying liquid sealing asphalt at the rate of 0.40 gallons per square yard then chipped with aggregate (Size No. 11) at the rate of twenty (20) pounds per square yard.

All work shall be in accordance with Section 407 of the Indiana State Highway Department Specifications.

Adjustments of Shoulders Necessitated by Resurfacing

The shoulders of the road shall be adjusted to the elevation of the resurfacing with all materials (i.e., earth, sod, gravel, crushed stone, asphalt, etc.) necessary. The transition may be made within a distance of one (1) foot to one and one-half (1 & ½) feet from the edge of paving except in unusual cases where a greater distance is required. Existing driveways shall be primed and wedged from a featheredge to the final height of the resurfaced street paving.

Restoration of Ground Surfaces

All ground surfaces in public Rights of Way, easements and on private property that have been damaged or destroyed by the Contractor's operations shall be restored in accordance with the following specifications. All surplus material, rock, trees, shrubs, concrete pipe, asphalt, crushed stone, etc., not to be used in the Contractor's restoration operations shall be removed from the site and disposed of in an acceptable manner.

Restoration of Grassed Areas with Sod

Where shown on the plans or required by the Detailed Specifications established grassed areas shall be restored with sod containing grasses of comparable quality. Sod shall be placed and rolled so that the final elevations of the area being restored are the same as existed prior to the beginning of construction. Sod shall be pegged where necessary, and shall be watered and cared for to assure its survival.

Restoration of Grassed Areas with Seed and Mulch

Where shown on the Plans and allowed by the Detailed Specifications the Contractor shall seed and mulch in one of the following manners as designated in the Detailed Specifications:

Bluegrass Seeding: The ground shall be loosened approximately three (3) inches deep with a disc or a harrow and fertilized with twenty-five (25) pounds of 10-10-10, or equivalent, and one hundred (100) pounds of agricultural lime per one thousand (1,000) square feet.

The mixture of seed applied shall be as follows:

65% Kentucky Bluegrass
25% Perennial Rye Grass (Lolium Perenne)
10% Red Top (Arrostis Alba)

The seed shall be applied at a rate of five (5) pounds per one thousand (1,000) square feet and shall be well raked or boarded into the soil and mulched with straw of sufficient thickness to hold the seed until it has germinated.

During those times of the year that seeding may be substituted for sodding, as directed or permitted by the Engineer, the seeding shall be as set forth above.

Rye or Fescue Seeding: The ground shall be loosened approximately three (3) inches deep with a disc or harrow; fertilized with twenty-five (25) pounds of 10-10-10, or equivalent, and one hundred (100) pounds of agricultural lime per one thousand (1,000) square feet, sown at a rate of seventy-five (75) pounds per acre with an approved grade of perennial rye or Kentucky No. 31 Fescue grass seed that will provide early growth during the season in which it is planted. The seed shall be well raked or boarded into the soil.

The time for application of the seed and fertilizer shall be at the discretion of the Engineer.

Mulching Material: Unless otherwise permitted by the Engineer, vegetable materials for mulching shall be wheat, oats, barley or rye straw only. All materials shall be reasonably free from weed seeds, foreign material, and other grasses and chaff, and shall contain no Johnson Grass. The straw shall be reasonably bright in color and shall not be musty, moldy, caked, or of otherwise low quality. The straw shall be dry on delivery, and spread evenly where necessary.

Unless otherwise specified, the bituminous material to be used for "tying down" straw mulch shall be a slow setting emulsified asphalt. The material shall be nontoxic to plants.

Mulch net may be used to hold mulch in place until turf is established. The net shall be made of a tightly twisted craft paper yarn, leno woven with a wrap count of one (1) pair of yarns per two (2) inches and a filling count of two (2) per inch. Salvage edges and center shall be reinforced with polyethylene filament. The material shall have a minimum width of forty-five (45) inches.

Clean Up

Before final acceptance of the work, the Contractor shall satisfactorily clean all areas within the limits of his operations including the street surfaces, walks, gutters, fences, lawns, private property and structures, leaving them in as neat, clean and usable condition as originally found. He shall remove all machinery, tools, surplus materials, temporary buildings and other structures from the site of work. He shall also remove all organic matter and materials containing organic matter from all areas and places used by him during construction. All pipes, manholes, inlets, etc., shall be cleared of all scaffolding, sedimentation, debris, rubbish and dirt.

Where the Contractor's operations have resulted in filling existing ditches, clogging existing culverts, damaging existing bridges, ground surfaces, sidewalks, driveways, etc., the Contractor shall re-ditch, clean culverts, repair or replace bridges, ground surfaces, sidewalks, driveways, etc. so as to return them to a condition as good as or better than existed prior to the beginning of his operations.

The Contractor's cleanup operations, which include repair, restoration or replacement of ground surfaces and existing improvements and the removal of rock, shall be performed continuously during the construction operations.

(SECTION WM 7)

SEWER PIPE

Description

The Contractor shall furnish and lay, as required, sewer pipe, together with all bends, branches, or other specials as shown on the plans or specified and, necessary to complete the work, including necessary pieces of sewer pipe for purpose of physical tests. Sewers shall be constructed of the pipe materials as specified.

All sewers to be furnished under this Contract shall conform to specifications of this section. Reference is also made to the following section of these Workmanship and Materials Specifications which are applicable to gravity sewers:

WM 8 - Laying of Sewers

Actual materials furnished for sanitary and/or storm sewer pipes shall be permitted only as indicated in the Detailed Specifications. All references to ASTM specifications shall be to the latest designation.

The following specifications shall apply to sewer pipe and joints together with all required bends, branches, fittings, and other specials required for installation; and to specimens of pipe and materials required for testing.

All sanitary sewer pipe shall be highly resistant to acids and alkalis, and shall be completely resistant to acids generated by the hydrogen sulfide corrosion cycle.

When tests of pipe materials are required by the Engineer, six copies of the test results shall be submitted to the Engineer immediately following the tests. Certificates, original and five copies shall be furnished to the Engineer certifying that all materials meet the designated ASTM Specification in these Workmanship and Materials Specifications.

Pipe Materials

1. Unreinforced Concrete Pipe

All unreinforced concrete sewer pipe furnished under this Contract shall be Class III, unless otherwise specified in the Detailed Specifications. All unreinforced concrete pipe shall conform to ASTM Designation C 14. All unreinforced concrete pipe shall be tested in accordance with ASTM Designation C 497.

2. Reinforced Concrete Pipe (RCP)

Reinforced concrete pipe shall be Reinforced Concrete Culvert, Storm Drain and Sewer Pipe conforming to ASTM Designation C 76. Pipe shall be Wall C, unless otherwise indicated on the plans or in the Detailed Specifications. Class shall be as required by loading conditions, but shall not be less than Class III.

Reinforced concrete pipe shall be tested in accordance with ASTM Designation C 497.

3. Reinforced Concrete Horizontal Elliptical Pipe (RCP-HE)

Reinforced Concrete Horizontal Elliptical Pipe shall conform to the requirements of the latest revision of ASTM Designation C-507, Class III, unless otherwise indicated on the Drawings or in the Detailed Specifications.

Reinforced Concrete Horizontal elliptical pipe shall be tested in accordance with ASTM Designation C-497.

All reinforced concrete horizontal elliptical pipe shall be TYPE "C" WALL when used for sanitary sewer purposes.

4. Vitrified Clay Pipe (VCP)

All vitrified clay pipe and fittings shall be extra strength pipe and conform to ASTM Designation C 700.

All vitrified clay pipe shall be tested in accordance with ASTM Designation C 301.

5. Plastic Truss Pipe (PVC/ABS)

All plastic truss pipe furnished under this Contract shall meet the requirements of ASTM Designation 2680 and ASTM D1784 for a minimum cell classification of 12454B or 12454C or ASTM D1788 for all classification of 2-2-3. The fill material shall be Portland Cement, Perlite Concrete or other inert filler material exhibiting the same degree of performance.

All pipe shall be tested in accordance with the Standard Method of Test for External Loading Properties of Plastic Pipe by Parallel-Plate Loading, ASTM Designation 2412. Pipe stiffness shall be a minimum of 200 psi. All joints shall be gasketed and meet requirements of ASTM D3212 and ASTM F477.

6. Polyvinyl Chloride Pipe (PVC)

All PVC pipe 15-inches or less in diameter furnished under this Contract shall meet the requirements of ASTM Designation D-3034. All PVC pipe greater than 15-inches in diameter shall meet or exceed the requirement of ASTM F-679. For diameters 15-inches or less, the pipe shall have a minimum cell classification of 12454-B and for diameters greater than 15-inches, the pipe shall have a minimum cell classification of 12454-C with all pipe having a minimum tensile strength of 7000 psi as defined in ASTM D-1784.

All PVC pipe shall be tested in accordance with Standard Method of Test for External Loading Properties of Plastic Pipe by Parallel - Plate Loading, ASTM Designation 2412. Minimum pipe stiffness shall be 46 psi.

7. Ribbed Polyvinyl Chloride Pipe (RPVC)

All Ribbed PVC Pipe furnished under this Contract shall conform to ASTM Designation F 794 for sewer pipes 8-inch thru 48-inch in diameter. All 8-inch thru 18-inch pipe supplied under this contract shall have a minimum uniform pipe stiffness of 60 psi. All pipe 21-inch

and larger shall have a minimum uniform pipe stiffness of 46 psi. The minimum cell classification shall be 12454-B as defined by ASTM D-1784.

8. High-Density Polyethylene Pipe (HDPE)

All High - Density Polyethylene Pipe furnished under this contract shall be manufactured from materials meeting the requirements of Type III, Class C, Category 5, Grade P34, as defined in ASTM D-1248, Standard Specifications for Polyethylene Plastics molding and extrusion materials.

Pipe and fittings shall be made from high molecular weight high density polyethylene material meeting the requirements of ASTM D-3350, cell class PE 334433C. All HDPE shall have a minimum pipe stiffness of 46 PSI when measured in complete accordance with ASTM D-2412. The Ring Stiffness Constant (RSC) classification value for pipe between bell and spigot shall comply with the minimum value of 36 lbs/ft.

This pipe shall be installed in accordance with the manufacturer's recommendations for this particular application.

The joints shall be manufactured with Bell and Spigot end construction with a rubber gasket to form a positive seal when assembled in the trench. The rubber gasket material and manufacture shall conform to ASTM F-477.

9. Corrugated Steel Pipe and Pipe Arch (CSP & CSPA)

Corrugated Steel Pipe and Pipe Arch Furnished under the Contract shall be fabricated with Helical Corrugations and a continuous welded seam extending from end to end of each length of pipe. The method of fabrication and materials to be used shall be in accordance and AASHTO specification M-36 for zinc coated (Galvanized) steel sheets. The pipes shall conform to Type 1 for circular sections and Type II for pipe arch sections. The minimum metal thickness for all corrugated steel pipes and pipe arches shall be fourteen (14) gage material unless otherwise shown on the plans or specified in the Detailed Specifications.

All Corrugated Steel Pipe and Pipe Arch shall be fully bituminous coated and one-hundred percent (100%) paved or lined in accordance with AASHTO Specification M-190, Type "D".

Corrugated Steel Pipe and Pipe Arch shall not be used for sanitary sewers.

10. Ductile Iron Pipe

All ductile iron pipe furnished under this Contract for gravity sewers shall conform to the requirements of ANSI A 21.51 or Federal Specification WW-P-421c Type II and shall be Class 2 with push-on-joints.

11. Polyvinylchloride Corrugated Pipe (PVCC)

All corrugated PVC pipe furnished shall conform to ASTM F949 for sewer pipes 6-inches through 18-inches. Minimum cell classification shall be 12454B or 12454C as defined by ASTM D-1784. PVC pipe shall have a minimum pipe stiffness of 50 psi in accordance with testing under ASTM D-2412.

Sewer Pipe Joints

1. Concrete Pipe Joints

Joints for sewer pipe manufactured of reinforced or unreinforced concrete shall be flexible watertight joints conforming to "Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible, Watertight, Rubber Gaskets" (ASTM Designation C 443). Joints shall be made using rubber or rubber-like materials manufactured to fit tongue and groove or bell-and-spigot type concrete pipe. The joint shall be installed in accordance with the manufacturer's recommendations.

2. Clay Pipe Joints

Joints for clay sewer pipe shall be compression- type-joints conforming to "Standard Specifications for Compression Joints for Vitrified Clay Bell-and-Spigot Pipe" ASTM Designation C 425). Joints shall be factory made bell-and-spigot joints. Bells may be of integrally formed fired clay or of epoxy-secured PVC plastic formed and fastened at the factory. Spigot ends shall be furnished with a resilient seating element of plastic, rubber or rubber-like material; the sealing element may be either factory or field-applied.

3. Plastic Pipe Joints

Joints for plastic pipe shall be elastomeric gasket joints in accordance with ASTM Designation D 3212. Gaskets used in the push-on-joints shall conform to ASTM Designation F-477. The pipe manufacturer shall provide "Home Marks" on the uncoupled end of each piece of pipe.

Joint Testing

Sanitary sewer pipe and joints furnished shall meet the following laboratory tests of assembled joints on random samples of each class, size, and type of pipe required for this Project.

All pipe shall be required to withstand a hydrostatic pressure of twenty (20) feet of water (8.6 psi) for two (2) hours while being deflected to the maximum amount recommended by manufacturer. Continuing the hydrostatic pressure, a shear load of one hundred (100) pounds per inch of nominal pipe diameter shall be applied to an unsupported spigot immediately adjacent to joint. During testing period, there shall be no visible leakage at joint.

Assembled joint tests shall be performed by an independent testing laboratory approved by Engineer at the expense of the Contractor. Tests shall be performed on not more than one percent (1%) of total length of pipe of each class, size, and type required for Project, except that at least two (2) specimens shall be used for each test.

Generally, pipe joint tests shall be performed as described in respective ASTM Specifications listed below, except that hydrostatic pressure and time of test shall be modified as above. All types of pipe joints shall be subjected to hydrostatic testing; in addition, vitrified clay, and concrete shall be subjected to the shear loading test.

ASTM specifications covering testing of sewer pipe joints include: "Standard Specification for Compression Joints for Vitrified Clay Bell-and-Spigot Pipe" © 425) for clay sewers; "Standard

Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, Using Flexible, Watertight, Rubber Gaskets" © 443) for concrete sewers; "Standard Specification for ABS Composite Sewer Piping" (D 2680) for ABS Plastic with type SC joint, Standard Specification for ABS Sewer Pipe and Fittings (ASTM Designation D 2751 and ASTM Designation D 3212); and "Standard Specifications for Type PSM PVC Sewer Pipe and Fittings" (D 3034 and D 3212) for PVC plastic with elastomeric gasket joints.

(SECTION WM 8)

LAYING OF SEWERS

General

This Workmanship and Materials section on the Laying of Sewers shall be divided into two (2) classifications - rigid and nonrigid conduit. Pipe materials such as concrete, clay, asbestos-cement, PVC/ABS truss, cast iron and ductile iron pipe are considered rigid conduits. Thermoplastic (PVC) and corrugated metal pipes shall be considered nonrigid or flexible conduits. Flexible pipe material used for pressure sewers shall be installed in accordance with WM-14.

The depths of the existing utilities (gas, water, telephone, etc.) are not shown on the plans. The contractor should anticipate a certain number of vertical grade conflicts between the proposed sewer and the existing utility based on the depth and size of the sewers, the number of utilities shown on the plans and previous experience. The Contractor shall include the time and expense which is typically associated with this type of conflict in his bid including down time, loss of productivity, mobilization and remobilization but not the cost of relocating the existing utility if that is found to be necessary.

Rigid Conduit Installation

All rigid conduit for sewer pipe shall be laid to the lines and grades shown on the plans, unless otherwise directed by the Engineer. All rigid pipe shall be laid in accordance with the details shown on the plans for the First Class Pipe Laying Method. This First Class Pipe Laying Method may be achieved by Class B bedding methods as shown in the ASCE Manual of Practice No. 37, latest edition. Under this Class B bedding Method, the pipe shall be bedded in compacted granular material (Class I or Class II as described in Section WM 3 of these Workmanship and Materials Specifications) placed on a flat trench bottom. The bedding shall have a minimum thickness of one-fourth (1/4) the outside pipe diameter below the pipe and shall extend halfway up the pipe barrel at the sides. All granular bedding material shall be placed in the trench in approximately six (6) inch layers. Compaction shall be accomplished by hand or mechanical tamping or by "walking" the granular material in. From the halfway point on the pipe (Springline) to a point twelve (12) inches above the top of the pipe, backfilling methods A or B or C as described in Section WM 3 of these Workmanship and Materials Specifications shall be used depending on the trench location. In addition, all rigid conduit shall be installed in accordance with "Standard Recommended Practice for Installing Vitrified Clay Sewer Pipe" (ASTM Designation C 12 and ASTM D2321).

The laying of pipe in finished trenches shall be commenced at the lowest point, proceeding upstream, with the spigot ends pointing the direction of flow.

No blocking under pipes will be permitted, except as approved by the Engineer for pipe to be encased in concrete or laid in concrete cradles.

Except as otherwise specified, the excavation work for the sewers shall be performed in accordance with the Workmanship and Materials Specifications for "Excavation."

The practice of blocking pipe up to grade with bedding material, then backfilling under is prohibited. The entire length of the bed section is to be at proper grade before installing pipe.

The supporting strength of the pipe is dependent upon its foundation and trench width. To develop normal strength, the pipe shall have a firm uniform foundation under the entire lower quadrant of the barrel. No weight should be supported by the bell. The maximum trench width as recommended by ASTM at the level of the top of the pipe shall be maintained as narrow as possible, taking into consideration the limitation of the excavation equipment except as may be permitted by the Engineer upon investigation of the soil conditions, laying methods and earth loadings.

All pipes and specials shall be carefully inspected before being laid, and no cracked, broken or defective pipe or special shall be used in the work. All pipe shall be carefully inserted in the bell in such a manner that there will be no unevenness of any kind along the bottom half of the pipes and so that there is a uniform joint space all around.

All pipe that is field cut shall have the homing-marks reestablished, insuring for proper seating depths. Pipes that are field cut shall have the cut ends retapered, by grinding or filing, as close to the original taper provided by the manufacturer as possible. When homing pipe with a spud-bar or other mechanical equipment, other than by hand, place a piece of wood between pipe and tool to prevent damage to bell end-section.

Pipe laid in open cut shall have all trench spaces and voids solidly and completely filled with suitable earth materials from the excavations which shall be thoroughly and solidly rammed into place, unless otherwise specified.

The joints shall be constructed as specified. The interior of the sewer shall, as the work progresses, be cleared of all dirt and superfluous materials of every description. Whenever pipe laying is discontinued, the unfinished end of the sewer shall be protected from displacement and cave-in or other injuries. During the process of the laying, care shall be taken to protect both pipes and joints from disturbance, and the trench shall be kept free from water until the joints shall have set. All surplus mortar or debris shall be promptly and completely removed from the interior of the pipes. On sewers twenty-four (24) inches in diameter and less, a disc mold or swab attached to a rod sufficiently long to pass two (2) joints from the end of the pipe last laid, shall be continuously worked through as the laying of the pipe proceeds.

The ends of the pipes shall be protected to prevent the entrance of dirt or other foreign substances. Such protection shall be placed at night or whenever pipe laying is stopped for any reason. Suitable plugs designed for use with the pipe material shall be provided and properly secured and used to cap all slants and branches. Pipe end protection and devices shall be included in the prices bid per linear foot of sewer.

Flexible Conduit Installation

Plastic sewer pipe (PVC) and other flexible pipe shall be carefully installed in accordance with the above specification for Rigid Conduit Installation, except where the following paragraphs modify those specifications.

Flexible conduit for sewer pipe shall be installed in accordance with "Underground installation of Flexible Thermoplastic Sewer Pipe" ASTM Designation C 2321.

The Contractor shall take special precautions when homing PVC pipe not to over-seat past the home-marks. The pipe installation must include adequate bedding to hold its proper placement, prior to installing the next section.

The Contractor shall use caution when stringing thermoplastic pipe. Excessive spans, in sunlight, will cause bowing damage; and said damaged spans will be rejected.

In addition to the construction and testing procedures outlined in other sections of these specifications, the Contractor shall be required to install the flexible pipe in such a manner so that the diameter deflection of the pipe shall not exceed five percent (5%) when tested in accordance with the Final Acceptance Test. Bedding materials surrounding the pipe shall be compacted to the densities required to meet the five percent (5%) maximum deflection requirement. The area requiring compaction shall be included in the bed and side fill material and also the material placed above the pipe for a distance of twelve (12) inches over the top of the pipe.

The First Class Pipe Laying Method for Flexible conduit may be achieved by Class B Bedding Methods as shown in the ASCE Manual of Practice No. 37, latest edition. Under this class B Bedding Method, the pipe shall be bedded in compacted granular material (Class I or II as described in Section WM 3 of these Workmanship and Material Specifications) placed on a flat trench bottom. The bedding shall have a minimum thickness of one-fourth (1/4) the outside pipe diameter below the pipe and shall extend twelve (12) inches above the top of the pipe level and full width of the trench. All granular bedding material shall be placed in the trench in approximately six (6) inch layers.

Compaction shall be accomplished by hand or Mechanical Tamping or by "Walking" the granular material in for Class I materials only. When Class II materials are used compaction shall be accomplished by hand or mechanical tamping only to a minimum eighty-five percent (85%) Standard Proctor Density. Backfill from a point twelve (12) inches above the top of the pipe to the trench surface shall be in accordance with "backfilling Methods A or B or C" as described in Section WM 3 of these Workmanship and Materials Specifications depending on the trench location.

Plastic pipe shall not be blocked, except where the plans or specifications call for concrete encasement or concrete cradles for the pipe. Blocks shall be encased in concrete also, or removed. Where plastic pipe is to be installed below maximum ground water table, adequate weights shall be provided to prevent flotation of the pipe.

Pipe and fittings shall be carefully inspected before being installed. Cracked, broken or otherwise defective pipe, shall not be used.

Leakage Testing

General

All sewers shall be tested for infiltration and exfiltration as specified. The Contractor shall furnish written reports of all test results to the Engineer.

Contractor shall furnish all labor, materials and equipment required for making tests, with no extra compensation over and above contract prices for sewers. Tests shall be made at times selected by the Engineer. Sections of sewers shall be isolated and measurements of infiltration and exfiltration shall be made by approved means. The Engineer must be present during all final tests.

Sewers whose crowns are below ground water level at time of testing shall be tested for infiltration. Where crown of pipe is above ground water level, sewer shall be tested for exfiltration. If ground water level varies during period of construction, sewers may be tested for both. Spans are not to be tested for Final Acceptance until complete.

Immediately preceding all leakage tests (exfiltration, infiltration and air) the sewer to be tested shall be cleaned by flushing a ball through the pipe. The Contractor shall furnish an inflatable rubber ball of a size that will inflate to fit snugly into the pipe to be tested. The ball may, at the option of the Contractor, be used without a tag line; or a rope or cord may be fastened to the ball to enable the Contractor to know and control its position at all times. The ball shall be placed in the last cleanout or manhole on the pipe to be cleaned, and water shall be introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris, or a damaged pipe shall stop the ball, the Contractor shall remove the obstruction.

Infiltration Tests

Sewers which are constructed with ground water level above Crown of pipe shall be tested for infiltration after sewers have been installed and backfilling has been substantially completed. A convenient section of sewer shall be selected between manholes. The upper section of sewer shall be plugged watertight with temporary bulkhead. A suitable measuring device shall be installed at the lower end.

The amount of water flowing through the outlet shall be measured periodically through the next twenty-four (24) hours. The flow thus measured shall then be converted by gallons per day per inch diameter per mile and compared with the maximum allowable limit of two hundred (200) gpd/in./mile.

Exfiltration Tests

A section or sections of sewer between manholes shall be isolated by water tight bulkheading. Isolated sections shall then be filled with water to a level three (3) feet above the crown of the pipe at the upstream end of the section; water level at the downstream end of the section shall not be more than six (6) feet above the crown of the pipe. After allowing the system to stabilize overnight, the section shall be refilled with water to the original level. After one (1) hour more, the volume of water lost in the section shall be determined by measuring the drop in the water level.

Allowable Leakage

Infiltration or exfiltration of any given segment of sewer pipe shall not be permitted to exceed a rate of two hundred (200) gallons per twenty-four (24) hours per mile of sewer per inch of pipe diameter (0.158 gph/in./100 ft.).

Low Pressure Air Testing

For pipes installed with the pipe crown above the ground water level, air pressure testing may be used in lieu of the exfiltration test. Low pressure air testing is used to determine the existence of pipe leaks; however, it does not indicate water leakage limits.

Prior to the low pressure air testing, all wyes, tees, or end of side sewer stubs shall be plugged with flexible-joint caps, or acceptable alternate, securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable, and their removal shall provide a socket suitable for making a flexible-jointed lateral connection or extension.

All plugs shall be securely braced to prevent possible blowout due to internal air pressure. One plug shall have an inlet tap, or other provision for connecting a hose to a portable air supply source. Air hose shall be connected to the inlet tap and a portable air supply source.

Air equipment shall consist of all necessary valves and pressure gages to control rate of air flow into the test section and to enable monitoring of air pressure within the test section. Testing apparatus shall also be equipped with pressure relief device to prevent the possibility of loading test section with full capacity of compressor.

Air shall be slowly added to test section until pressure inside pipe is raised to 4.0 psig. After a pressure of 4.0 psig is obtained, air supply shall be regulated such that pressure is maintained between 3.5 and 4.0 psig for a period of two (2) minutes, to allow air temperature to stabilize in equilibrium with temperature of pipe walls. Pressure will normally drop slightly until equilibrium is obtained. During this period, all plugs shall be checked with soap solution to detect any plug leak.

After this two (2) minute air stabilization period, air supply shall be disconnected and test pressure allowed to decrease. Time required for test pressure to drop from 3.5 psig to 2.5 psig is determined by means of stop watch, and this time interval is then compared with required time to determine if rate of air loss is within the allowable limit. Required time to arrive at the allowable air loss is calculated by means of following formula:

$$T = \frac{0.0850 DK}{Q}$$

Where:	T	=	Time in seconds
	K	=	.000419 DL but not less than 1.0
	Q	=	Rate of loss (=0.003 cfm/sq. ft. of internal surface)
	D	=	Diameter of pipe in inches
	L	=	Length of pipe tested in feet

Upon completion of test, the bleeder valve shall be opened and all air allowed to escape. Plugs shall not be removed until all air pressure in test section has been released. Also, no one shall be allowed in trench or manhole while test is being conducted.

Pipes larger than thirty (30) inch diameter shall be tested in smaller segments. Length of segments shall be such as to produce a total allowable air leakage of only two (2) cfm when computed on basis of 0.003 cfm/sq. ft. of internal pipe surface.

All pipe lines forty-two (42) inch diameter and over shall be tested one joint at a time with joint testing apparatus. Joint shall be isolated with an expanding shield equipped with gaskets which fit tightly against pipe walls on each side of joint to be tested. Allowable leakage for such a test is equal to that which would occur on the basis of allowable leakage for one length of pipe.

If measured time interval for the pressure to drop from 3.5 psig to 2.5 psig is less than the required time as calculated, sewer section shall be deemed to have failed test. Contractor shall then proceed to repair pipe at his cost as necessary until the sewer section passes the test. All testing shall be conducted in presence of Engineer or his representative (inspector).

Excessive Leakage

If infiltration or exfiltration rate of sewer exceeds maximum rate specified, contractor shall make all necessary repairs to reduce leakage below the allowable. Such repairs shall be made at Contractor's expense. Under no circumstances will grouting be considered an acceptable means of repair. When repairs have been completed, but not more than thirty (30) days after first test, sewer section shall be subjected to a second leakage test as specified above.

If the second test should again indicate leakage in excess of the allowable amount, the Contractor shall, at his own expense, provide complete internal inspection of entire section in question, by means of videotape recording of television inspection or by color photography with exposures every two (2) to four (4) feet along the sewer. Contractor shall employ an independent sewer testing service to inspect pipe. Inspection service shall prepare a written report and shall review videotape or films with Engineer, Contractor, and Owner's representative. Contractor shall then submit a written plan for correction of leakage. Contractor, Owner, and Engineer shall meet as necessary to develop actual program for inspection and repair. Contractor shall not proceed to repair line until he receives written authorization to proceed from Owner or his representative. All inspections, reports, repair, replacement, and compensation for additional professional and administrative expense shall be paid by the Contractor.

Deflection Testing of Installed Flexible Plastic Pipe

Final Acceptance Test

Prior to the final deflection test, the Engineer may, at his option, order the lamping of certain or all sections. Lamping must show a "full moon" and no excessive puddling effects in the span.

The main line shall be flushed prior to the vertical ring deflection tests. The vertical ring deflection tests shall not be performed prior to successful completion of leakage testing requirements.

All main line PVC and PVC/ABS Truss sewers eight (8) inch in diameter and greater shall be measured for vertical ring deflection at least thirty (30) days after installation, but no later than thirty (30) days prior to final acceptance of the project. Maximum ring deflection of the pipeline under load shall be limited to five percent (5%) of the vertical internal pipe diameter. All pipe exceeding this deflection shall be considered to have reached the limit of this serviceability and shall be relaid or replaced by the Contractor at no additional cost to the Owner.

The cost of all deflection testing shall be borne by the Contractor and shall be accomplished by using a deflectometer, which will produce a continuous record of pipe deflection, or by pulling a mandrel, sphere, or pin-type go/no-go device through the pipeline. The diameter of the go/no-go device shall be ninety-five percent (95%) of the undeflected inside diameter of the flexible pipe. The mandrell shall be pulled through the sewers by one man, by hand and specifically without the aid of mechanical devices.

(SECTION WM 20)

SMALL NONMETALLIC PIPE, FITTINGS AND VALVES

Description

Nonmetallic pipe, fittings and valves shall be of the trade name as noted on the plans or set forth under the Detailed Specifications. Unless otherwise specified, the pipe and fittings according to trade name shall comply with the following requirements:

- (a) PVC pipe 1½" diameter and less shall be a rigid polyvinyl chloride pipe which is made in accordance with the latest ASTM Specifications D 1785 and D 1784 for Type I, Grade 1, maximum chemical resistance. Unless otherwise specified, the pipe shall be made to Standard Thermoplastic Pipe Dimension Ratio (SDR) Class 26 for continuous pressure rating of 160 psi for water at 73.4 degrees F. The pipe shall bear the seal of approval of the National Sanitation Foundation (NSF). Pipe shall be supplied either plain-ended or with a coupling attached at one end of each full length of pipe.

Fittings shall be of the socket type unless otherwise shown or specified or required to make connections to metal pipe, equipment, etc. The fittings shall be purchased from the pipe manufacturer and shall be of same material, construction and design at least equal to the adjacent pipe.

Pipe and fittings shall be jointed with a solvent cement consisting of a viscous, brushable solution of polyvinyl chloride in suitable active solvents. The cement shall be purchased from the pipe manufacturer and used according to the manufacturer's instructions and shall produce a joint of sufficient strength to permit normal installation handling within five (5) minutes after jointing, when exercising reasonable care.

Where threaded joints are required, the PVC pipe to be threaded shall be Schedule 120. The dies shall be sharp and in good condition to assure a clean and smooth threading operation from start to finish. Suitable wrapping shall be used as a joint sealer for all threaded joints.

Long straight runs of exposed PVC pipe shall be provided with expansion joints to compensate for changes in length due to thermal expansion and contraction.

Valves used in PVC pipe lines shall be made of PVC Type I (unplasticized polyvinyl chloride) designed for not less than 150 psi working pressure at seventy degrees Fahrenheit (70°F).

- (b) Fibercast pipe shall be a rigid centrifugally cast thermoset epoxy resin reinforced pipe with multiple layers of seamless braided glass fiber sleeving. The pipe shall be standard "Line Pipe" made for maximum operating temperature of two hundred twenty degrees Fahrenheit (220°F). Joints, unless otherwise specified, for pipe and fittings, may be made by threading or cementing. Fittings shall be of same composition as the pipe. Valves shall be made of nonmetallic material as approved by the Engineer.

Erection and Supports

The piping shall be installed and supported in accordance with the applicable Workmanship and Materials Specifications for "Small Metal Pipe and Fittings", WM 19, under the headings: "Erection" and "Pipe Supports for Interior Piping". Flanged joints in lieu of unions may be used to permit ready breaking of joints for future inspection and maintenance. All joints shall be made in accordance with the instructions and/or recommendations of the manufacturers.

The spacing of supports shall be such as to avoid any deflection in the pipe under operating load. Pipe sleeves shall be provided as specified under the Workmanship and Materials Specifications for "Small Metal Pipe and Fittings", WM 19. The manufacturer shall be consulted for recommendations as to proper support spacing and the necessity for expansion joints.

Testing

All nonmetallic pipe shall be tested for watertightness as specified hereinafter under the Workmanship and Materials Specifications heading "Hydrostatic Tests", WM 15, if the pipe line is to be used for conveying a gas, then the line shall be tested by an approved method or procedure which will prove the joints to be gas tight under actual service conditions.

Installation Below Ground

The installation of nonmetallic pipe below ground shall be performed in accordance with the applicable Workmanship and Materials Specifications for "Cast & Ductile Iron Pipe Laying", WM 12, and "Excavation", WM 2, and as recommended by the pipe manufacturer.

(SECTION WM 21.1)

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work under this Section consists of providing all labor, materials and equipment necessary or required for the complete fabrication and erection of all structural steel as detailed on the Structural Drawings and as specified herein. The work includes furnishing and installing the non-shrink grout beneath the structural steel.
- B. Related work specified elsewhere:
 - 1. Steel Joist Section WM21.2
 - 2. --Steel Roof Deck Section WM21.3
 - 3. Miscellaneous and Metal and Aluminum Section WM22
 - 4. Painting Section WM32

Loose Lintels are furnished under Section WM22, Miscellaneous Metals.

- C. Work furnished but not installed: Anchor bolts and other embedded connection components.

1.02 QUALITY ASSURANCE

- A. The latest editions of the following standard specifications shall govern the fabrication and erection of the structural steel, except as modified by the design drawings or this specification:
 - 1. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings".
 - 2. AISC: Code of Standard Practice for Steel Buildings and Bridges", except that Section 4.2.1 is specifically excluded.
 - 3. AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
 - 4. AWS "Structural Welding Code D1.1".
 - 5. Steel Structures Painting Council Specifications SSPC.
- B. All welders in both shop and field shall be certified under AWS "Standard Qualification Procedure" for the type or types of welding being performed and shall have been continuously engaged in such welding.
- C. Fabricator and erector shall have continuous business operation for at least 5 years and by evidence of past projects indicate capability of conducting work of a similar nature; have sufficient well maintained equipment to perform the work; maintain an adequate stockpile of materials; qualified labor to fabricate or erect without delay the materials required for this project.

1.03 SUBMITTALS

A. Shop Drawings:

1. Shop Drawings shall be submitted to the Engineer for review. Shop Drawings shall include erection plans and framing elevations, all shop and erection details including copes, connections, threaded fasteners, and welds. No fabrication shall begin until shop drawings have been reviewed.
2. Provide setting drawings, templates and directions for installation of anchor bolts and other devices.

B. Certifications:

1. Provide certification for all welders used in field and shop work.

C. Test Reports:

1. Submit all test reports regarding welding, bolting, and headed studs per Section 3.03.

1.04 PRODUCT HANDLING

- A. Exercise care in handling, storing and erection of structural steel to avoid damage to pieces, welds, joints and paint. Secure pieces against displacement in transit.
- B. Structural steel members which are stored at the job site shall be stored above ground on platforms, skids or other supports. Protect with weatherproof cover held in place.
- C. Clean members which have become soiled before erecting.
- D. Anchor bolts and other anchorage devices which are embedded in cast-in-place concrete shall be delivered to the project site in time to be installed before the start of concrete operations.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel Shapes, Bars and Plates: ASTM A36 unless noted otherwise on the Structural Drawings. High strength steel is designated on the Structural Drawings by using the yield point strength parenthetically as a suffix, thus (50), high strength steel shall conform to the requirements of ASTM A572.
- B. Structural steel tubing: ASTM A500, Grade B, $F_y = 46$ ksi.
- C. Structural steel pipe: ASTM A53, Type E or S, Grade B, $F_y = 35$ ksi or ASTM A501, $F_y = 36$ ksi.
- D. Connection bolts: ASTM A325N (bearing bolts).
- E. Anchor bolts: ASTM A36.

F. Drilled-in anchors (expansion bolts): KWIK-Bolt stud anchor by Hilti Fastening Systems (or approved equal).

G. Welding rods: AWS E70XX for A36 and Grade 50 steel.

H. Headed studs (used as anchor studs or as shear connectors): ASTM A108.

KSM Fastening Systems, Omark Industries
Nelson Stud Welding, TRW Nelson Division
Blue Arc Welding Studs, Erico Products

I. Deformed bar anchors: ASTM A496.

KSM Fastening Systems, Omark Industries
Nelson Stud Welding, TRW Nelson Division

The use of manually welded anchors, rods, bars, straps, or reinforcing bars is not acceptable as a substitute for headed studs or deformed bar anchors.

J. Malleable Iron Wedge Inserts: Hohman-Barnard (or approved equal).

K. Grout: non-metallic, non-shrink, high-strength grout (minimum 5000 psi compressive strength at 28 days).

Five Star
Kemset
Masterflow 713
Quikrete

L. Shop paint: Per Section WM21.1- 2.03.

2.02 FABRICATION

A. Fabricate structural steel in accordance with the AISC "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings" with the modifications and additional requirements specified in this Section.

B. Shop connections shall be welded or bolted with A325 bolts.

C. Use only low hydrogen electric arc electrodes.

Manual welding shall be accomplished with shielded arc electrodes of E70XX series or the strength equivalent of flux cored arc weld. Submerged arc process welding shall be grade SAW-2.

D. Connections:

1. Unless otherwise noted, beam connections shall be simple connections.
2. The steel supplier shall design the connections for at least the reactions indicated on the framing plans, but never less than 50% of the total allowable uniform load on the span.

3. Connection angles shall be 5/16" in thickness (Minimum).
 4. Minimum connection strength shall not be less than that of two 3/4" diameter A325 bolts.
 5. Beam connections shall consist of double web angles unless detailed otherwise on the drawings.
- E. Welds shall be tested as outlined in Section 3.03. The correction of faulty welds shall be in accordance with AWS "Structural Welding Code D1.1".
- F. Steel members of different grades but of the same size and length shall be marked and detailed to prevent misplacement during erection. Varying connection gages between grades of steel is an acceptable means of prevention.
- 2.03 SHOP PAINTING
- A. Shop paint all structural steel except the following:
1. Contact surfaces in connections using high strength friction bolts,
 2. Surfaces to be field welded,
 3. Structural steel that will receive sprayed-on fireproofing,
 4. Steel encased in concrete,
 5. Embedded steel items (surfaces in contact with concrete),
 6. The top surface of the top flange for all composite beams,
 7. Crane rails.
- B. Shop Primer:
1. Material: 37-77 Tnemec Primer or as specified in WM-32
 2. Volume solids: 55.0 ± minimum
 3. Shop primer shall be compatible with the specified finish paint.
- C. Surface Preparation:
1. SSPC - SP6 Commercial Blast Cleaning
- D. Application:
1. Structural steel shall receive one coat of shop paint except surfaces inaccessible after assembly shall receive a second coat.
 2. Dry film thickness: 2.0 mils minimum.
 3. Follow coating manufacturer's printed directions.

PART 3 - EXECUTION

3.01 ERECTION

- A. Erect in accordance with the AISC "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings".

- B. Field connections shall be made using A325 high strength bolts, bearing type, except where welded connections are called for on the Drawings.
- C. Bolt Tightening:
1. High Strength Bolts shall be "friction" type fasteners when used in the following connections:
 - a. Connections subjected to loosening.
 - b. Connections subject to fatigue due to vibrations.
 - c. Connections subject to stress reversals.
 - d. Wind bracing connections.
 - e. Fasteners in oversized, short or long slotted holes."Friction" type fasteners shall be tensioned in accordance with Table 3 of the "Specification for Structural Joints using ASTM A325 or A490 Bolts". The contact surfaces in a "friction" type connection shall be left unpainted as noted in section 2.03, A, 1.
 2. High Strength Bolts shall be designed as "bearing" type fasteners and tensioned in accordance with Table 3 of the "Specification for Structural Joints using ASTM A325 or A490 Bolts" when used in the following connections.
 - a. Connections subject to tension loads.
 - b. Column splices in structures over 100 feet in height.
 - c. Beam to Column connections in structures over 125 feet in height.
 3. High strength bolts that are not covered by sections 3.01, C, 1 & 2 shall be "bearing" type fasteners. These fasteners need only be tightened to a "snug-tight" condition. "Snug-tight" shall be as defined in the "Specification for Structural Joints using ASTM A325 or A490 Bolts".
 4. High strength bolts described by sections 3.01, C, 1 & 2 may be tightened by any method found acceptable by the "Specification for Structural Joints using ASTM A325 or A490 Bolts" unless otherwise noted on the drawings.
- D. Set all structural steel accurately to lines and grades. Connect temporarily with sufficient high strength bolts to insure complete safety of the structure until permanent connections are made. Erection tolerances shall be in accordance with the AISC Code of Standard Practice.
- E. Provide temporary guy lines, bracing, and shoring as required, to maintain stability and alignment until the entire system (including metal deck erection) is erected, permanently connected, braced and set.
- F. Any and all misfits shall be reported to the Engineer for resolution. Burning of new or unfair holes or cutting with a torch will not be permitted without the approval of the Engineer. Reamers, twist drills and saws shall be employed where burning is prohibited.
- G. Any member that has assumed a bend or buckle in its final position due to forced fit shall have one or both ends and any intermediate connections unbolted and re-drilled or reamed to relieve such bowing to the satisfaction of the Engineer.
- H. No piece that has been bent, broken, twisted or otherwise damaged shall be incorporated into the work. Such pieces shall be repaired or corrected on the ground to the satisfaction of the Engineer or replaced with a new piece. Failure to observe this will be cause for rejection of the piece in place.

- I. Prior to the erection of any steel, the Contractor shall verify the location, elevation and plumbness of all anchor bolts and concrete surfaces. The Contractor shall report immediately to the Engineer in writing any condition which he finds unacceptable or that would prevent erection of the structural steel within AISC tolerance for plumbness and elevation. The Contractor shall be responsible for all corrections, and all corrections shall be made in a manner acceptable to the Engineer.
- J. The erector shall acquaint himself with all conditions at the site which can affect his methods and sequence of operations. Abide by Owner's regulations concerning traffic, parking and construction material delivery.
- K. FIELD TOUCH-UP BY STEEL ERECTOR: Field bolts, field welds and abrasions to the shop coat shall be repaired and painted by the structural steel erector using the same paint and care as for shop coat. All such surfaces shall be washed with a suitable degreasing solvent. This contractor shall also remove any and all accumulations of mud, clay, rust, scale, grease, etc. that have been acquired, for any reason, during shipment, storage and erection and the shop coat restored to its original condition.
- L. Sub base (levelling) plates under column base plates will not be permitted.
- M. Install headed studs using manufacturer approved equipment in accordance with the manufacturer's instructions.
- N. Furnish all anchor bolts for anchorage of structural steel at an advance date for incorporation into the concrete foundation by others. Provide heavy hex nuts and washers for each bolt. Anchor bolts shall not be installed until shop drawings have been reviewed.
- O. Observe all federal, state and local laws and area trade rules in the erection and handling of structural steel.

3.02 CLEANING UP

- A. Upon completion of erection, promptly remove all tools, equipment and rubbish caused by or resulting from the erection work.

3.03 TESTING

- A. All testing shall be by a testing agency approved by the Engineer, performed by registered/qualified technicians. The Contractor will employ the testing agency.
- B. Test shop and field welds as indicated below:
 - 1. All complete penetration welds shall be tested for 100% of the total weld length using ultrasonic testing apparatus.
 - 2. All partial penetration welds shall be tested for 50% of the total weld length using the magnetic particle method.
 - 3. 20% of all fillet welds shall be tested using the magnetic particle method.
 - 4. All welds shall be visually inspected.

- C. Inspect and test bolted connections; (see Section WM21.1, 3.01C). A minimum of 10 per cent of the bolts (and no less than 2 bolts in each connection) that are tightened per paragraph 3.01C, 2 shall be tested.
- D. Inspect and test headed anchor studs and shear connector studs in accordance with the provisions for quality control of shear connectors, "Structural Welding Code", AWS D1.1.
- E. Test reports shall be prepared by the testing agency giving the following:
 - 1. The type and location of test conducted.
 - 2. The test results.
 - 3. Interpretation of the test results stating whether they comply with the Specification requirements.
 - 4. Procedure taken if the test results are not acceptable.
 - 5. Test results of re-tests after corrective measures have been completed. The cost of all re-testing of faulty welds shall be borne by the Contractor.

(SECTION WM 22)

MISCELLANEOUS METAL AND ALUMINUM

Description

Miscellaneous metal and aluminum includes all weir plates, stop plates, pipe supports, anchors, steel lintels, steel angle sills, iron castings, access panels, etc., and all welding required for fabrication and erection; all as indicated on the plans and as specified to be furnished for the complete construction of the work under this contract. Items such as stiffeners, supports and pipes or other equipment, fasteners loose angles or any other metal items required and not separately specified in other sections of these specifications shall be supplied and installed by the Contractor. The Contractor will be responsible for thoroughly studying the plans for varying conditions involved and materials required.

(a) General

Standards - Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the contractor, in such cases, may at his option use any article, device, project, material, fixture, forms or type of construction which in the judgment of the Engineer expressed in writing is equal to that specified.

(b) Shop Drawings

The Contractor shall submit for approval, shop drawings in accordance with the provisions, Shop Drawings, of the General Conditions, of all Miscellaneous Metal work included in this contract. The drawings shall show the design, location and all necessary details of such work.

(c) Materials

Cast Iron shall be tough, close grain, gray iron of uniform physical character.

Structural Steel shapes and plates shall fulfill the requirements of ASTM's most recent specification.

Bar Steel shall be hot rolled steel bars produced in accordance with good mill practice for general commercial use and shall be bessemer or open hearth grade.

(d) Workmanship

General

Miscellaneous metal work shall be fabricated and erected in a thorough and workmanlike manner by mechanics skilled in their line of work. All exposed joints shall be close fitting and all bolts, screws, etc. where exposed shall be cut off flush with nuts or other adjacent metal. The contractor shall do all drilling and cutting required for installation of

Miscellaneous Metal Work, except where such drilling and cutting are definitely specified in other sections of these specifications.

Steel and Wrought Iron shall be well formed to shape and size, with sharp lines and angles. Shearing and punching shall leave clean, true lines and surfaces. Weld or rivet permanent connections. Do not use screws or bolts where they can be avoided; where used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening. Curved work shall be evenly sprung.

Castings shall be sound and free from warp, holes and other defects that impair their strength or appearance. Exposed surfaces shall have a smooth finish and sharp, well defined lines and arises. Machined joints, where required, shall be milled to a close fit. Provide necessary rabbets, lugs and brackets so that work can be assembled in a neat and substantial manner.

Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to weather shall be formed to exclude water. Provide holes and connections for work to be built into adjoining construction.

Anchors - Miscellaneous metal work to be built in with masonry shall be of a form required for anchorage or shall be provided with suitable anchors, expansion shields, etc., as shown on the plans, or as specified.

Joints

Unless otherwise shown, or specified, all joints shall be of such character and so assembled that they will be as strong and rigid as the adjoining section. Exposed joints, where specified, shall be welded their entire length and other work shall be continuously welded or spot welded as required. All welded face joints shall be dressed flush and smooth.

Threaded Connections shall be made up tightly so that the threads will be entirely concealed by fittings. Abutting bars shall be shouldered and beaded, doweled and pinned. Except as otherwise shown, specified or approved, all shop assembled connections shall be welded or riveted; and rivet, bolts or machine screws may be used for field connections.

Rivet, Bolt and Screw Heads - Miscellaneous metal work shall be cut, punched drilled and tapped as required for the attachment of other work where shown on approval of shop drawings.

(e) Installation

General - Work under this Division shall be installed in conformity with approved shop drawings and shall be securely fastened in place. Doors shall be hung and have all hardware attached.

Built-In Work - Work to be built in with masonry shall be furnished in ample time and shall be set and secured in place.

Attached Work - Except where otherwise specified for a particular item of work, or where the work is required to be built in, miscellaneous metal shall be fastened to masonry with expansion or toggle bolts. Fastening to wood plugs in masonry will not be permitted. For attachment to concrete, a self-drilling concrete anchor shall be used. Screws shall be threaded all the way to the head of the screw. Unless otherwise specified all fastening devices shall be suitable type of Ackerman-Johnson Co., Hohmann-Barnard, Inc., Heckman Building Products or equal.

(f) Structural Steel Items

All items of miscellaneous structural steel such as loose lintels, clip angles, channel frames, not attached to the structural steel frame shall be furnished under this Section. Lintels to be sixteen (16) inches longer than span.

(g) Structural Channel Frames

Furnish and erect at locations shown channel door jambs with anchors for jambs as shown. Bottom of jambs to set one (1) inch below floor level. Weld bar stop of size shown to web of channel. Arc welds ground smooth.

(h) Iron Castings

Iron castings shall include all cast iron frames and covers for manholes or at other locations as shown, manhole steps, stop plank guide grooves and any other castings as shown on plans or specified shall be tough, close grained, gray iron, free from blowholes, shrinkage, and cold shuts. They shall conform to the latest standard of the American Society for Testing Materials, Designation A 48-70.

(i) Painting

Before shipment from shop, all miscellaneous metalwork, except galvanized and nonferrous metal, or work specified to be factory finished, shall be thoroughly cleaned of all foreign matter, ruts, scale, dirt and the like, followed by a shop coat. Parts inaccessible after assembly to receive second coat. This painting is in addition to the other painting specified.

All prime or shop coats shall be applied in accordance with Section 32 of the Workmanship and Materials or as noted in other Sections of the Detailed Specifications.

Wherever dissimilar metals make contact with each other, each surface shall receive a coat of liquid neoprene, plus one (1) coat of bitumastic paint. Allow full drying between coats and before installation. Aluminum surfaces in contact with masonry, steel or other metals shall be back coated as specified above.

Wrought Iron

Rolled wrought iron structural shapes, sections and bars shall conform to the ASTM Standard Specifications, Designation A 207. Wrought iron plates shall conform to the ASTM Specification for "Wrought Iron Plates", Designation A 42.

Aluminum

Aluminum weir plates and stop plates shall be fabricated of structural grade aluminum alloy. Aluminum stop plate grooves shall be fabricated of extruded aluminum alloy. The aluminum alloy shall be equal to or better than 60601-T6. Aluminum stop plates and grooves shall be equal to those made by Neenah Foundry Company, Washington Aluminum Company, Inc., or equal.

The gate plates shall be fabricated of one fourth (1/4) inch aluminum sheets and fitted with suitable lift handles of a similar aluminum material. All fastenings and attachments shall be made by welding. The stop plate grooves shall be kept free of concrete and once installed, the stop plates shall slide freely in the grooves without binding.

(SECTION WM 29)

ROADWAYS & PARKING AREAS

Description

New roadway construction shall be performed in accordance with this Specification (Section WM 29). Existing roadway repair and/or rehabilitation shall be performed in accordance with Section WM 4 (Restoration of Surfaces).

Subgrade

The subgrade of the roadways and parking areas shall be shaped either by cutting or filling as the plans may show or as directed by the Engineer. The area between the lines shown on the plans or necessary for construction shall be cleared of all brush, logs or other perishable material. During the construction of all embankments the subgrade shall be formed and maintained in such a manner that the surface water will readily flow off the embankment. The subgrade shall be brought to the correct grade on cuts and to approximate grade on fills with the proper allowance for settlement and shall then be allowed to settle. The subgrade shall be brought to the true shape and grade before the surfacing is placed.

The work shall include all necessary earth excavation, grading, and making of embankments and fills which shall be performed in accordance with the applicable Workmanship and Materials Specifications.

Gravel or Crushed Stone Roadway

The gravel or crushed stone roadway shall consist of a surface course laid on the prepared subgrade. The surface course shall be composed of run of the bank gravel, run of the crusher stone, crushed or uncrushed sand and gravel, or a uniformly blended mixture or combination of any of these materials. The materials shall be reasonably well graded from coarse to fine, generally within the following limits, unless otherwise specified or approved by the Engineer.

<u>Sieve Designation</u> <u>Square Openings</u>	<u>Passing</u>	<u>Percent Retained</u> <u>Retained</u>
1 ½"	100	0
1"	80-100	0-20
¾"	70-90	10-30
½"	55-80	20-45
No. 4	35-60	40-65
No. 8	25-50	50-75
No. 30	15-30	70-85
No. 200	5-10	90-95

The surface course material shall be deposited and spread uniformly upon the prepared subgrade, in a single layer eight (8) inches in thickness measured before compacting. The material shall be free of lumps of clay and shall be of uniform mixture and density when placed. Portions of the layer in which the aggregates become segregated in spreading shall be removed and replaced with

satisfactory material. Material shall not contain free water or frost, and shall not be placed in snow or on soft or frozen subgrade.

After being uniformly spread, the surfacing material shall be harrowed with a spike tooth harrow and floated with a road drag or grader until the surface is free from waves or irregularities. Harrowing and floating shall be continued until the surface has the required grade, line and cross section as shown on the plans, except that the harrowing shall not be carried on at such time or to such extent that the fine material will be separated from the coarse material. If the surfacing material is not thoroughly compacted by traffic before final acceptance or placement of hot asphaltic concrete pavement, then it shall be accomplished by means of suitable roller and wetting to obtain maximum density.

Use of Roadway During Construction

The Contractor may prepare the subgrade of the roads at the start of construction and use them throughout the construction period either with or without placing the surfacing material. If the crushed stone or gravel is placed and the road used during construction period, then the Contractor shall perform all necessary patrol maintenance at frequent intervals and add any additional crushed stone or gravel required to maintain the road. Before the final acceptance of the work, the roads and parking area including shoulders shall be brought to the grade and cross section shown on the plans and left in a condition satisfactory to the Engineer.

Roadway Ditches

All open ditches and channel changes parallel to and adjacent to the road shall be performed as a part of the roadway work. Lines, grades and cross sections of ditches shall be as shown on the plans unless otherwise required by the Engineer to obtain proper drainage.

Hot Asphaltic Concrete Pavement

Where shown on the plans or specified, the Contractor shall construct hot asphaltic concrete pavement over the compacted gravel or crushed stone surface course.

The hot asphaltic pavement construction shall be performed in accordance with the applicable sections of the latest edition of the Indiana State Highway Commission, referred to herein as "State Specifications".

The surface of the gravel or crushed stone surface course shall be graded to the required elevations and cross sections as shown and/or as established by the Engineer. All soft spots and/or unstable or unsatisfactory base material shall be removed and replaced with suitable granular material to provide a satisfactory base beneath all area to be paved. The newly placed or previously placed base material shall be scarified, brought to optimum moisture condition and thoroughly compacted ahead of the paving operations.

The hot mix asphaltic concrete shall be constructed in two courses. Section 403 of the State Specifications shall govern the materials and construction of the hot asphaltic concrete pavement except that only crushed stone shall be used in the surface course. Each binder course shall be laid to a one and one half (1 ½) inch thickness (one hundred sixty-five (165) pounds per square yard) and the surface course shall be laid one (1) inch thick (one hundred ten (110) pounds per square yard). All of the asphaltic concrete surface shall be Type B of the State Specifications.

(SECTION WM - 31)

SEEDING AND SODDING

General

The areas to be seeded shall be those areas which are shown on the plans or as specified in the Detailed Specifications.

Prepared Seedbed

Prior to start of preparation of seeding the Contractor shall remove all kinds of debris, sheds, tools, equipment and materials from the area to be seeded. The areas to be seeded shall be loosened and reworked by means of discing, harrowing, and rolling; or reworked by means of powered rotary tiller; so that the ground will be left in a satisfactory manner ready for seeding. The surface of the area to be seeded shall be left smooth and uniform which conforms to the finished grades and cross sections as shown on the plans, or as otherwise specified.

Time of Seeding

Spring seeding shall be done between March 1 and May 15, and Fall seeding between August 15 and October 15. During these periods, the time of seeding shall be determined by the Engineer whose decisions shall be based on the moisture content of the soil, and weather conditions. The Engineer may, at his option, extend the seeding season. (Mulched seeding may be done between March 1 and October 15 or possibly later in the fall.)

Lime, Fertilizer and Seed

Lime: Agricultural hydrated lime shall be uniformly applied at a rate of one (1) ton per acre over the area to be seeded unless otherwise specified. The Contractor may substitute one and one half (1 ½) tons of agricultural ground limestone for one (1) ton of agricultural hydrated lime.

Fertilizer: Fertilizer of the 10-20-10 grade shall be uniformly applied over the area to be seeded at the rate of 0.44 ton for each acre to be seeded unless otherwise specified. The above fertilizer is equivalent to four hundred (400) pounds ammonium sulphate, 20%N; three hundred fifty-five (355) pounds triple super phosphate, forty-five percent (45%) P_2O_5 ; one hundred thirty-three (133) pounds murate of potash, sixty percent (60%).

Spreading Method: The lime and fertilizer shall be spread uniformly over the area to be seeded, and shall be mixed into the top two (2) inches of soil with a disc harrow, rotary tiller, mixer or hand raking.

Seed: Unless otherwise specified, the following Pure Live seeds shall be mixed and applied at the rate of one hundred twenty (120) pounds per acre (2.8 pounds per 1,000 square feet):

Kentucky Bluegrass - Pao Pratensis -----	70 lb.
Kentucky 31 Fescue - Festuca Elatior,	
var. arundiancea -----	30 lb.
Red Fescue - Festurca rubra -----	30 lb.

Seeding Method

The Contractor shall employ the broadcasting method for seeding. The sowing seed mixtures shall be kept thoroughly mixed during the sowing operations to prevent separation of species and the subsequent lack of uniform distribution of species. The sowing shall be stopped when satisfactory results are not likely to be obtained due to excessive moisture, high winds, or other unfavorable conditions.

Seed shall be broadcast by either hand or by approved sowing equipment at a rate which will provide not less than the minimum quantity of pure live seed as specified. The seed shall be uniformly distributed over the designated areas. If sowing is by hand methods, one half (½) the seed shall be sown when the sower is moving in one (1) direction and the remainder sown with the sower moving in right angles to the first direction. Where seed is sown by means of approved broadcasting equipment, the seed may be sown with a single pass of the equipment. Broadcast sowing shall not be done during windy weather. The seed shall be covered by means of a brush harrow, spike tooth harrow, chain harrow, cultipacker, or other approved device, so that most of the seed will be placed within a satisfactory depth range.

After the seed has been sown, and prior to compacting, the lawn area shall be cleared of all stones or other objects larger than two (2) inches in greatest diameter, and all wire, roots, brush or other objects that may interfere with subsequent mowing operations.

Mulched Seeding

General

When specified in the Detailed Specifications, the required mulch seeding shall consist of seeding as specified hereinbefore under the heading of "Seeding", and then covering the seeded areas with mulch.

Mulch

The mulching material may consist of straw, chaff, clover, timothy, alfalfa, peppermint or soy bean hay, shredded fodder or clover chaff. All mulch shall be free from primary noxious weeds as set forth under Section 913.04 of the Indiana Department of Highways Standard Specification.

The mulching material at the time of delivery to the site of the work shall not contain more than fifty percent (50%) moisture. The mulching material shall be applied uniformly in a continuous blanket to a depth of approximately two (2) inches. After being held down, the mulch shall be thoroughly wetted, care being taken not to displace the seed or soil underneath.

Holding Mulch in Place

Unless otherwise specified, the mulch shall be held in place in accordance with Section 621.04, Method 1, 1985 IDOH Specifications. Regardless of the method used, the mulching material shall be satisfactorily maintained in place until final completion and acceptance of the work.

Sodding

General

The areas to be sodded shall be those areas which are shown on the plans or as specified in the Detailed Specifications. Sod shall be fibrous, well rooted bluegrass, or other approved sod, with the grass cut to a height of not more than three (3) inches. Edges of sod shall be cleanly cut, either by hand or machine, to a uniform thickness of not less than one and one half (1 1/4) inches, to a uniform width of not less than sixteen (16) inches, and in strips of not less than three (3) feet in length.

Sod shall be free from all primary noxious weeds as defined by the Indiana State Seed Law.

Preparation of Ground before Sodding

The area to be sodded shall be smooth and uniform, and shall conform with the cross section required by the Plans or as directed. Grades prepared for sod shall be of sufficient depth below adjacent unsodded areas so that newly laid sod will conform with the surrounding surface.

After the grade has been prepared, and the topsoil has been spread, three fourths (3/4) lb. of agricultural hydrated lime and one fifth (1/5) lb. of 10-20-10 fertilizer shall be applied to each square yard, and thoroughly mixed into the top two (2) inches of soil. The area shall then be raked, and all clods, stones and debris removed.

Laying Sod

Sod strips shall be carefully laid by hand in the direction designated by the Engineer. At the edges of sodded areas the sod shall be carefully fitted into the grade, if excavated.

The sod strips shall be butted closely together to avoid any open joints. After laying and the initial watering, the sod shall be firmly tamped or rolled to insure firm contact with the soil underneath and shall conform with the surrounding surface. After compaction, the sod shall present a smooth, even surface, free from lumps and depressions.

Sod placed on slopes shall be pegged if directed by the Engineer. Pegs shall be driven down until not more than one (1) inch protrudes above the sod surface. The number of pegs shall be sufficient to hold the sod in place.

Watering Sod

The sod shall be thoroughly watered immediately after placing, and the watering continued for at least seven (7) days. If, at the end of thirty (30) days the sod is in good growing condition, the Contractor will not be required to repair or replace any sod which may thereafter be injured or damaged because of drought, unless written agreement for out of season sodding provides otherwise. The Contractor shall furnish the water at his expense.

Seasonal and Temperature Limitations for Sodding

No sod shall be laid during the months of June, July and August, unless written permission is obtained from the Engineer. When such permission is received the Contractor shall, before laying the sod out of season, agree in writing to the following provisions:

1. Sod shall be in good, live and growing conditions;
2. Sod shall be placed within thirty-six (36) hours after cutting and during that period be protected from damage;
3. Sod shall be watered sufficiently, and otherwise maintained so that it will be in a live, growing condition at the time other items of the contract are accepted, provided the period between placing sod and acceptance is greater than thirty (30) days.

Winter sodding will be permitted when the temperature is above thirty-five degrees Fahrenheit (35° F). No frozen sod shall be laid and no sod shall be laid on frozen soil. Sod shall be properly protected from drying out or freezing and shall be laid within forty-eight (48) hours after cutting.

(SECTION WM 34)

BUILDINGS AND SUPERSTRUCTURES

(SECTION WM 34A - MASONRY WORK)

Materials

Brick: All brick shall be whole, sound, thoroughly burned, red shale brick of the types specified or required. Unless otherwise shown on plans or specified, the brick shall be standard size, two and one fourth by three and three fourths by eight (2 1/4 x 3 3/4 x 8) inches. Blend and color shall be as shown on the plans or as ordered by the Engineers. Bricks shall be delivered by truck, carefully unloaded by hand, culled by the Contractor and separately piled according to class.

Lightweight Concrete Block units shall conform to the requirements of ASTM Specification C 90 for Type I Hollow Load Bearing Concrete Units. Blocks shall be eight by twelve by sixteen (8 x 12 x 16) inches, eight by eight by sixteen (8 x 8 x 16) inches, eight by six by sixteen (8 x 6 x 16) inches, or eight by four by sixteen (8 x 4 x 16) inches as per where shown on the plans, with special and fractional units as required. Specials as noted or detailed on the plans, and any other special shapes required shall be furnished. Units with special insulation and or decorative properties shall be furnish as shown on the Plans or specified in the Detailed Specifications.

Mortar for masonry, unless otherwise specified or ordered, shall be cement-lime mortar, machine mixed, using the following materials, or equal: sand-fine, sharp and clean, ASTM C 144; lime, ASTM C 207, Type S; cement - Portland cement, ASTM C 150, Type I; water - fit to drink. Mix shall be by volume using one (1) part of cement, one and one fourth (1 1/4) parts of hydrated lime, and five and one half (5 1/2) parts of sand. For increased water retentivity and shrinkage control, admixtures may be used in accordance with directions of the manufacturer.

Only sufficient mortar shall be prepared for immediate use, and any mortar that has set shall not be retempered or used in the work. Prepared or patented mortar may be used only with prior approval by the Engineer. Setting accelerators or antifreeze compounds shall not be used.

Dovetail Anchor Slots shall be placed vertically in all concrete walls where masonry is to be laid. All anchors shall be made of 24 gauge galvanized steel and provided with filler to prevent cement grout from seeping into the slot opening. The slots shall be placed twenty-four (24) inches O.C., unless otherwise shown.

Dovetail Ties shall be made of galvanized steel designed to fit the conditions or anchorage of the masonry to the concrete walls. Brick anchors shall be not less than 14 gauge. Stone anchors shall be not less than three sixteenths (3/16) inch thick. The dovetail ties shall be installed twenty-four (24) inches O.C., unless otherwise shown. Where masonry frames into structural steel, approved galvanized metal ties of required length shall be fastened to the steel columns at not less than twenty-four (24) inches O.C.

Wall Reinforcement for masonry walls shall be standard weight "Block-Trus", "Dur-O-Wal", or equal butt weld steel of trussed design. Unless otherwise shown, the wall reinforcement shall be placed in first and second bed joints eight (8) inches apart immediately above lintels and below sills at openings and in every second bed joint (sixteen (16) inches O.C.) throughout remainder of structure. The reinforcement in first bed joint immediately above and below openings shall be

continuous. In second bed joint the reinforcement shall extend two (2) feet beyond each side of opening. All other reinforcement shall be continuous except where there are vertical masonry control joints. Reinforcement shall be lapped not less than six (6) inches at splices. Corners shall be cut and bent for continuous reinforcement. Cavity type walls shall be tied and/or reinforced at above specified intervals with galvanized steel "Block-Trus", "Dur-O-Wal", or equal, trussed style, heavy duty with drip-section. Vertical reinforcing shall be as shown on the plans.

Control Joints

Vertical control joints shall be constructed where shown on the plans and where directed by the Engineer or dictated by common practice. Joints shall be constructed by sawing brick or masonry units as required to create the vertical joint. The mortar shall be raked from both faces of the joint to create a one-half (1/2) inch deep recess. After the mortar has achieved its initial set, the recess shall be filled with an elastomeric caulk such as silicon which has been tinted to match the mortar color. Horizontal reinforcing shall continue thru the joint.

Masonry Methods

Wetting of Brick - except in freezing weather, all brick shall be thoroughly wetted as necessary to reduce their rate of absorption of water at the time of laying.

Laying - all masonry shall be laid up true to line, plumb and square with full bed and head joints. All brick and concrete block shall be slightly shoved and tamped into position. Concrete blocks shall have full mortar coverage on vertical and horizontal faces. All spaces shall be solidly filled with mortar. Courses shall be carried up level and no section of wall shall be carried more than three (3) feet above any adjacent section, except as specifically permitted. Brick and concrete units shall be properly coursed and bonded with vertical joints forming a neat regular pattern.

All joints shall be approximately three eighths (3/8) inch uniform thickness. Horizontal and vertical joints shall be tooled, struck to remove projecting mortar, and given final tooling to produce a compacted smooth and concave surface.

Solid Wall Construction - Except where metal ties are shown or required for bonding, the brick masonry shall be bonded by headers at every sixth course on both interior and exterior faces. Every header shall be separated by two (2) stretchers. The back of the exterior brick course on the front of the backup shall be plastered with a mortar coat of not less than three eighths (3/8) inch thickness. The interior or exterior masonry course shall then be laid immediately. In any case, all spaces between masonry units shall be filled solid with mortar. Solid type wall construction shall be water-tight against driving rains. If necessary, joints shall be cut out and repointed or the wall shall be taken down and rebuilt to make them watertight at the expense of the Contractor.

Cavity Wall Construction - Cavity type of walls, where shown on the plans shall be reinforced or tied as specified above under the heading "Wall Reinforcement". Weep holes at approximately four (4) feet centers shall be provided at the bottom exterior face of any cavity type masonry walls. The weep holes may be formed by placing well-greased sash cord or rubber tubing in the horizontal mortar joints and pulling them out after the mortar has hardened; or they may be formed by leaving a small opening in the head joint. The cavity shall be kept clean in an approved manner. An approved waterproof flashing shall be provided at the bottom of the wall and over doors, windows or other openings in the walls to prevent the formation of moisture or entry of water to the inner wall.

Protection - Cover all walls with waterproof canvas or heavy fibered and tarred paper, after each day's work and during rains.

To facilitate heating and protection of masonry work and of the interior of structure, temporary enclosures shall be made of all doors, windows and other openings.

When atmospheric temperature is forty degrees Fahrenheit (40° F) or lower, or whenever the government weather bureau predicts such temperatures within the twenty-four (24) hours succeeding, the masonry work shall be protected. All masonry materials and mortar ingredients shall be heated, as deemed necessary by the Engineer to prevent freezing. Protection and heating shall be as follows, subject to such modification as the Engineer may direct or approve.

During and following the laying of masonry work, the work shall be housed in or sufficiently covered and heated to a temperature of not less than fifty degrees Fahrenheit (50° F) for a period not less than seventy-two (72) hours after the masonry work is completed.

Bricklayers' scaffolding shall be enclosed by means of screens formed of canvas, wood or other material satisfactory to the Engineer. Other means for the protection of masonry work and workmen may be submitted by the Contractor to the Engineer for approval.

Mortar shall be mixed in an approved mechanical mixer and shall be maintained at a minimum temperature of fifty degrees Fahrenheit (50° F) during mixing, distributing and placing. Mixing water shall not be heated in excess of one hundred forty degrees Fahrenheit (140° F). Sand for mortar shall be heated so as to remove all frost, but shall not be heated to the point of scorching. The use of calcium chloride or other salts in any ingredients for mortar will not be permitted.

Protection and heating facilities shall be submitted to the Engineer for approval. Heating by the use of steam is preferred. If salamanders are used, they shall be fired with coke and satisfactory precautions taken to prevent drying of brickwork. All protective and heating facilities, including fuel, shall be furnished, installed, maintained, and operated at the sole expense of the Contractor.

Masonry Around Openings, Etc. - Window and door frames shall be set plumb and true, and securely braced. No brick smaller than a header shall be used at window jambs, door jambs or other openings. Sills and lintels shall be set at their proper elevations without the use of half courses. All joints between masonry and window or door frames shall be thoroughly filled with mortar. Sills, lintels, bearing plates, etc., shall be set in full beds of mortar.

All interior partitions shall be bonded, or tied, to exterior walls and anchored, or tied, to steel framework or joists in accordance with best accepted practice.

Unless otherwise shown, the coursing shall be so arranged as to give at least two courses of solid brick under all concrete slabs or beams and beneath all steel or wood joists and beams. The first bearing course of concrete block masonry beneath the two brick bearing courses shall be solidly filled with concrete or mortar.

The Contractor shall build-in, as required or directed, all anchors, flashings, sleeves, piping, conduits, frames, brackets, structural steel plates, loose lintels and similar miscellaneous iron work, as well as other items to be built into masonry. Pipe chases, pockets, etc., shall be built as shown or required.

Cleaning - All exposed masonry shall be cleaned down with soap powder or detergent and clean water applied with stiff fiber brushes and again washed and rinsed with clean water. All mortar droppings shall be removed from projecting surfaces of whatever kind. If, in the opinion of the Engineer, wire brushes and soap and water do not suffice for cleaning of face brick, the brick surface shall be thoroughly wetted with clean water and then scrubbed with a solution of not more than one (1) part hydrochloric (muriatic) acid to twenty (20) parts water, followed immediately by a thorough rinsing with clear water. If masonry is cleaned with an acid solution, then all sash, metal lintels and other metal subject to corrosion shall be thoroughly protected.

Water Repellent

The exterior surfaces of all exterior brick masonry walls shall be given two (2) saturating coats of ready to use silicone base water repellent. The coating shall be applied by either a low pressure spray apparatus or an ordinary paint brush in accordance with the recommendations of the manufacturer of the repellent. Water repellent shall not be applied prior to satisfactory completion of cleaning operations as determined by the Engineer.

(SECTION WM34B - CARPENTRY)

General

Lumber shall be of the kind, size and dimensions shown on the plans, as specified and required for the work for which the lumber is to be used. All lumber shall be well seasoned and kiln-dried containing not more than twelve percent (12%) moisture. For any purpose the lumber shall be free from shakes, waves, black and unsound knots and all kinds of decay. All lumber shall be squared to the required dimensions throughout the entire length. Lumber grades for the different items shall be commercial grades and shall be graded under the respective grading rules of the producing associations.

Materials

Unless otherwise shown on the plans or specified in the Detailed Specifications, the species and grade of lumber to be installed in the various locations shall be as follows:

Rough Lumber Usage

Kind of Wood & Grade

Framing - joists, rafters
studs, studs, bucks, plates

No. 2 or better, Douglas Fir or Southern Yellow Pine

Furring, grounds, ribbons
bridging, blocking

No. 2 or better, Douglas Fir or Southern Yellow Pine

Wood trusses and purlins
or joists for use with wood trusses

Structural grade Douglas Fir or No. 1 Southern Yellow Pine

Exterior finish and trim,
exterior doors, windows
and door screen frames

Red Cypress, "C" Select, or White Pine, "C" Select, or
Redwood, Cert, Kiln Dried, Clear all heartwood

Rough Lumber Usage

Kind of Wood & Grade

Window sash Ponderosa

White Pine, "C" Select, except bottom rail shall be Red Cypress "C" Select

Interior finish and trim

White Pine, "C" Select, or Ponderosa Pine, "C" Select

Shelving

White Pine "C" Select

Cabinets and counters

Clean White Birch or Oak

Wood doors

No. 1 grade of the National Door Mfg. Association for flush panel Ponderosa Pine doors. Exterior doors one and three fourths (1 3/4) inch thick, Interior door one and three eighths (1 3/8) inch thick

Timbers - Lumber for heavy timbers stressed in bending, compression or tension shall be structural grade Douglas Fir or No. 1 Southern Yellow Pine.

Workmanship

Lumber and millwork delivered to the site shall be carefully piled off the ground in such a manner as to insure proper drainage, ventilation and protection from the weather.

All nailing blocks, wood bricks, grounds, and wood blocking shall be installed as required, and shall be of good sound wood of proper dimensions, securely anchored to the masonry. Blocks and grounds for nailing trim, frames, and other finish woodwork shall be spaced at not over sixteen (16) inch centers. Grounds shall be plumb, level, straight, and true to line.

All wood members shall be neatly fitted, securely nailed or bolted and properly supported. All rough and finish hardware shall be installed in a neat and workmanlike manner. Trim shall be neatly put in place. All joints at the end of trim shall be caulked and intermediate joints shall be mitred. Moldings shall be in long pieces. All joints shall be put together with stiff white lead.

Finishing nails properly driven and set, or screws properly countersunk shall be used. Drilling for nails and screws shall be done if necessary to prevent splitting. Material with hammer marks or other defects shall be replaced with undamaged material. All work shall be securely anchored to the masonry. The effect of swelling and shrinkage shall be considered in securing woodwork and precautions taken to prevent warping and the opening of mitres and splits. End of sills shall in general be given a coat of lead and oil.

All wood trim and millwork, except surfaces which are to receive stain and varnish finished, shall be primed on all surfaces with lead and oil paint in strict accordance with standard practices. At the option of the Contractor, priming may be done at the mill.

(SECTION WM 34C - PRECAST CONCRETE ROOF SLABS)

The roof slabs shall be constructed of precast units of cross-section and lengths shown on plans or as specified. Unless otherwise shown or specified they shall be reinforced by the manufacturer to carry a uniform superimposed load of fifty (50) lbs. per square foot. Tension reinforcing steel shall be hot rolled rods or equivalent with a yield point of at least 45,000 lbs. per square inch. All concrete shall have a minimum compressive strength of 3750 lbs. per square inch. The slabs shall be cured by the manufacturer by keeping them damp for seven (7) days or by the equivalent of this in steam curing. One eighth (1/8) inch thick Masonite board bearing pads shall be provided beneath bearing ends of the slabs and rodafom or equal sealing pads shall be provided between the roof slabs and the top of all non-bearing walls.

The slabs shall be grouted by a mixture of not less than one (1) part cement to three (3) parts fine sand, care being taken to see that the joints are filled. The units shall be installed tight together and at right angles to the bearing wall. The slabs shall be aligned and leveled in a workmanlike manner using equipment recommended by the manufacturer.

The open ends of all slab cores shall be insulated to a minimum depth of twelve (12) inches with "Fiberglas" insulation.

Openings shall be neatly formed and properly reinforced in the slabs at the locations shown on the plans. Caulk along exterior joints at junction of slabs with the bearing masonry walls. Caulking compound shall be gun consistency and as specified under "Caulking".

Erection drawings shall be prepared showing all details and submitted to the Engineer for approval prior to manufacture.

(SECTION WM 34D - ROOFING AND INSULATION)

The Contractor shall cut and fit in place four by four (4 x 4) inch cant strips around the inside edge of the roof and if necessary around vent openings.

Roof applicator shall carefully inspect surfaces to be covered and check cant strips, saddles, etc. for proper grade and drain before starting application, and he shall report to the Engineer any defects that will affect the proper application or durability of the roof, so same can be corrected before starting the application of the roofing or insulation. Over the entire area, mop on one (1) inch of fibre insulation board and a dry sheet, breaking joints as recommended by the manufacturer of the roofing materials used.

After the deck is in proper shape to receive same, applicator shall furnish and place four (4) piles of 15# saturated asphalt felt lapping each ply twenty-four and one half (24 & ½) inches over the preceding one (1), mopping the full width under each with an approved brand of roof pitch.

Over the entire area pour a uniform coating of an approved brand of pitch and embed therein, while hot, 400# of roofing grade gravel per one hundred (100) square feet.

Roof flashing shall extend up on the vertical surfaces as shown. Also extend the flashing and make watertight connection with any existing adjoining roofs.

The Owner reserves the option of requiring the material manufacturer and roofer to furnish a twenty (20) year Surety Bond which shall be drawn up in a form approved by the Engineer. In such case the roofer shall be reimbursed by the Owner in the amount of the actual charge made by the manufacturer for the bond.

(SECTION WM 34E - FLASHING AND SHEET METAL)

Materials: All materials incorporated in the finished work shall be furnished in compliance with the following specifications. All roof flashing and counter flashing, except as otherwise shown or specified, shall be fabricated of sixteen (16) ounce copper or aluminum, with all seams where necessary soldered, and overlaps in the direction of flows.

All gutters, scuppers, and downspouts shall be made of twenty (20) ounce copper or aluminum. The scuppers shall be molded of design and size shown on the plans and fitted with bottom outlet for connection to downspout. Provide copper or aluminum flashing around scuppers ready to receive roofing. The downspouts shall be of size and length shown on the plans. Caulk joint between downspout and cast iron soil pipe drain.

Fascias and gravel stops shall be of design shown of the plans, and unless otherwise shown, shall be made of thirteen (13) gauge aluminum.

All concealed flashing as shown on the plans for base of walls, over lintels, beams beneath window sills, etc. shall be made of three (3) ounce insulating and waterproofing barrier, unless otherwise noted or specified.

Installation: All sheet metal and flashing shall be fabricated and installed by skilled workmen accordance with the best standard practice. Counter flashing shall be placed into the parapet wall and existing walls as detailed on the plans. All flashing, counter flashing, gravel stops and fascias shall be installed in accordance with the manufacturer's direction and in compliance with the requirements for issuance of a surety guaranty roof bond. Scuppers through parapet walls where shown on plans shall be fabricated and flashed to prevent entrance of water into the wall. Flashing at parapet walls, valleys, roof drains, vent pipes, lintels, sills, and other locations shall be installed where required to provide tight walls and roofs and as detailed on the plans.

All necessary changes in existing gutters, downspouts, flashing, etc. shall be made in a satisfactory manner to fit the new work to the existing structures and make watertight.

(SECTION WM 34F - VITRIFIED CLAY WALL COPING)

All wall copings shall be vitrified clay coping in glazed reddish brown color. Corner units shall be provided for all corners. All joints shall be caulked solid with masonry mortar except that exposed face of the joints shall be raked clean to a one half (½) inch depth and later caulked solid with gun consistency compound.

(SECTION WM 34G - CUT STONE AND CAST STONE)

Cut Stone

Cut stone shall be standard gray, Indiana Oolitic limestone, building stock, free from all defects that would materially impair the strength, durability or appearance, and shall have a smooth rubbed finish.

All cut stone shall be dressed so as to have uniform close fitting joints and be cut so that brick backing will bind into the stone. The reveals and top beds shall be smoothly rubbed. Window and door sills shall have proper washes and seats. All work shall be squared and full edge. All projecting members shall be provided with deep drip. Offsets and coping shall be beveled. Where shown or required, holes, chases, openings, recesses, etc., shall be cut for steel beams, anchors, conduits, downspouts, etc. Stones shall have at least four (4) inches bearing on walls.

Cast Stone

Cast stone shall be made of Class A concrete as defined in the Workmanship and Materials Specifications for "Concrete". The cast stone shall be of uniform color, free from all defects which will impair the strength, durability or appearance, and shall be free of stains. The finish of the exposed surfaces shall be smooth, showing no form or mould marks. Cast stone which shows voids, cracks, chips or other defects will be rejected.

Cast stone shall be accurately cast to shape and dimensions. Exposed plane faces shall be true with beds and joints straight at right angles to the face, unless otherwise shown. Washes shall be cast on top of all copings, sills and base courses as shown, with lugs and seats for masonry work where indicated. All projecting members shall be provided with deep drip. Stones shall have at least four (4) inches bearing on walls.

Drawings

Prior to manufacture of cut stone and cast stone, complete shop and setting drawings of the stonework shall be submitted to the Engineer for approval. Shop drawings shall show accurately, in detail, dimensions and sections of the stone, and details of the trim, joining, bonding and anchoring.

Handling and Installation

All cut stone and cast stone shall be carefully transported and handled to prevent damage and shall be stored above ground with covering, all in a manner to prevent stains and/or discoloration.

Every stone shall be set on a full bed of mortar with vertical joints full. The vertical joints of copings shall be raked out to a depth of one half (½) inch and caulked with a gun grade of synthetic rubber sealing and caulking compound.

Mortar shall be nonstaining cement lime mortar composed of one half (½) part nonstaining cement, one half (½) part of lime paste and three (3) parts of clean fine sand. Sand and lime shall be thoroughly mixed and the cement added.

All projecting members shall be protected where necessary with wooden guards to prevent damage during construction. All stone shall be thoroughly and satisfactorily cleaned upon completion of the work before final acceptance.

The Contractor shall furnish and set all anchors, dowels, etc., and make all sinkages, holes, ties, etc., for placing same. Provision for the proper anchoring, dowelling and cramping of work in keeping with standard practices, including support of stone by shelf angles and loose steel when required, shall be clearly shown on shop drawings. Galvanized iron anchors shall be used for the anchoring of the stone to masonry backing.

(SECTION WM 34H - CAULKING)

Caulk around all exterior windows and door frames and make the job watertight. Also, perform all other caulking as specified and as shown or noted on the plans. Unless otherwise shown or specified, the caulking compound shall be gun consistency, "Kaukit" as made by Sonneborn, "Vulcatex" as made by A.C. Horn, or equal.

(SECTION WM 34I - MISCELLANEOUS IRON AND ANCHORS)

Furnish and install all anchors, rings, covers, inserts, sleeves, anchor bolts, supports, hangers, etc., shown on the plans or required to complete the job. Furnish and install dovetail anchors, in all concrete walls which are shown to be covered with a brick veneer. Dovetail anchors shall be spaced to not exceed twenty-four (24) inches on vertical centers.

(SECTION WM 34J - METAL DOORS AND TRIM AND HARDWARE)

Door sizes and location shall be as noted on the plans. Unless otherwise shown or specified, exterior and interior doors shall be of hollow metal; frames and accessories shall be stock manufacture constructed to the size, shape and pattern shown on the plans. Frames, jambs, and trim shall be No. 16 U.S. gauge and of welded construction. The frames shall be securely anchored to the masonry and shall be set plumb and true. The jamb shall be reinforced and rabbeted to receive hinges for the door.

The exterior door frames which are shown or specified to be equipped with aluminum screen doors, shall be furnished with concealed reinforcement and mortised to receive the hardware of the screen door. The template requirements for the screen door shall be furnished by the Contractor. Exterior doors shall be one and three fourths (1 3/4) inches thick and interior doors one and three eighths (1 3/8) inches thick unless otherwise shown on the plans. Doors shall be formed of eighteen (18) gauge metal with proper reinforcement, stiffeners and welded joint ground smooth. Panels shall be insulated with one fourth (1/4) inch sound retarding filler and stiles and rails where used shall have cork fillers to eliminate metallic sound. Where required or shown, moldings shall be formed of twenty (20) gauge metal and shall be secured by screws. Stiles in panel doors shall be not less than five (5) inches wide.

The bottom of all exterior doors shall be provided with hook spring bronze weatherstripping. The doors shall also be provided with a bronze umbrella stripping along the bottom exterior face of the door to shed rainwater runoff away from the threshold.

All doors shall have one (1) prime coat and two (2) finish coats of enamel baked on at the factory in a color to be selected by the Owner unless otherwise designated. Frames shall be prime finished at the factory, dipped or sprayed and baked. Final finish will be applied at the site.

Doors shall be "Ceco", "Fenestra", "Richmond", or equal.

Door Closers - Unless otherwise shown on the plans or specified, the door closers shall be Norton Regular Surface Closer, LCN Traditional, or equal.

Hardware - The hardware, locks and hinges shall be made of bronze, dull finish, as furnished by the door manufacturer. Unless otherwise specified, the locks shall be furnished with key on one side and turn button on other side. If possible, the locks shall be master keyed to fit the existing locks; otherwise, the new locks shall be keyed to fit the new doors only. Bronze rubber nosed floor or wall type bumpers shall be provided for all interior doors. Hardware may be the standard product of the metal door manufacturer, equivalent to Yale & Town Mfg. Co., Sargent Co., Russel & Erwin Mfg. Co., or equal.

(SECTION WM 34K - ALUMINUM SCREEN DOORS)

Size, number and location of screen doors shall be as shown on the plans. Screen door frames shall be made of extruded aluminum alloy 6063-T5 with one and one eighth by three and one half by one eighth (1 1/8 x 3 1/2 x 1/8) inch wall and shall be of welded construction. The doors shall be of the combination type with interchangeable aluminum framed DSB glass and screen panels. The lower panel of the door shall be provided with a #12 guard woven from .062 inch x five sixteenths (5/16) inch round edge flat aluminum wire on one and one half (1 1/2) inch centers and mounted in #60 extruded aluminum. Kick plates which are .090 inches thick shall be provided.

The aluminum doors shall be given belt polish finish (C-I) over their entire surface and then receive two (2) coats of methacrylate lacquer.

The door shall be provided with complete hardware including door closer, lock and hinges. The hardware shall be U.S. 26D (dull chrome) finish except door closer which shall be painted in aluminum color. Suitable dielectric insulators shall be provided where aluminum connections are made to ferrous metals.

(SECTION WM 34L - THRESHOLDS)

Unless otherwise shown or specified, all exterior doors shall be provided with aluminum thresholds four (4) inches wide by one half (1/2) inch high with integral water stop providing weather protection. Thresholds shall be embedded in a full bed of cement mortar, or caulking compound and anchored solidly to the floor.

(SECTION WM 34M - ALUMINUM AND STEEL SASH)

Unless otherwise shown or specified, aluminum and/or steel sash windows shall be of size and type as noted on plans, commercial projected, as manufactured by Ceco, Bayley or equal. Ventilator of all windows shall project out, unless otherwise shown.

The sash shall be set plumb and true, properly aligned and secured to the brick jambs, sills and lintels by approved anchors, or bolts and clips.

Hardware throughout shall be bronze for steel sash and aluminum alloy for aluminum sash. Ventilators shall be fitted with cam locking handle. Steel sash windows shall receive one (1) coat of rust-resisting primer before shipment from the factory. Screens shall be provided for all vent openings designed for easy attachment from inside of building. Screen frames shall be of solid extruded aluminum shapes. Screen cloth shall be heavy weight No. 18 mesh, aluminum hardware cloth held in frames by aluminum splines.

(SECTION WM 34N - GLASS AND GLAZING)

Windows shall be glazed using a good grade of steel glazing compound. Glass shall be properly putted, secured by glazing clips, then putted in a neat manner.

Unless otherwise specified, all windows and doors shall be glazed with clear sheet glass, double strength "A" quality, not less than one eighth (1/8) inch thick, and all doors shall be glazed with one fourth (1/4) inch thick plate glass.

(SECTION WM 34 O - GLASS BLOCK PANELS AND GLASS BLOCK VENTILATORS)

Glass Block Panels Glass

Blocks: shall be hollow units of pressed glass hermetically sealed at high temperature. The blocks shall be furnished in size shown on plans.

Furnish all materials and do all work necessary to install the glass block panels as shown on the plans and as specified.

Mortar shall be same as specified for masonry work. Reinforcing wall ties shall be galvanized. Asphalt emulsion, oakum, caulking compound and expansion strips shall be provided as recommended by the glass block supplying manufacturer.

Installation: all sills receiving glass blocks shall be coated with a heavy layer of asphalt emulsion at least one sixteenth (1/16) inch thick which shall be allowed to dry before laying the first bed of mortar. Install expansion strips at panel jambs and head, below shelf angles, at mullions and other places as shown on plans. Strips shall run continuously so that edges of the glass block panel do not come in contact with the building structure, except at sills. Blocks shall be laid plumb, true and level with all mortar joints filled completely with mortar, shall run continuously with ends lapped six (6) inches, installed in mortar joints which are approximately twenty-four (24) inches apart. Joints shall be tooled smooth and slightly concave just before mortar attains initial set so that exposed edges of the block are sharp clean lines.

Pack oakum between the faces of the block and the sides of the chases after the mortar has set. Ram the oakum back at least three eighths (3/8) inch from the finished surface. Fill the recess thus formed at jambs and heads of panels with mastic caulking compound, both inside and out to provide tightly sealed panels. Surplus mortar shall be removed and the faces of the block shall be wiped dry at the time the joints are tooled.

Glass Block Ventilators: Unless otherwise shown on the plans or specified, glass block ventilators, or ventilating windows to be installed in glass block panels, shall be either the Residential Hopper Type or Commercial Projected Type as noted on the plans. The frames and sash shall be made of 63ST-5 aluminum alloy. Head section of ventilator units shall be designed to be load bearing for

the glass blocks above. Each unit shall be provided with latch and screens. Screen cloth to be 18 mesh alclad aluminum. Residential type ventilators shall be furnished with 7/32 inch glass retained in aluminum side wings by the manufacturer. Glass to be clear, except obscure for toilet rooms, unless otherwise noted. Glazing for commercial projected type ventilators shall be done by the Contractor.

Installation of the glass block ventilators shall be performed in accordance with the instructions of the manufacturer.

PART 7

SPECIAL PROVISIONS

PART 7

SPECIAL PROVISIONS

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PART 7

SPECIAL PROVISIONS

1. Application of Special Provisions/Specifications

The purpose of these Special Provisions is to amplify the Information for Bidders, General Conditions, and/or the General Construction Specifications. Whenever conditions as set forth in any of the Specifications conflict with conditions of other Sections of the Specifications, the following order of precedence shall apply:

- a. Part 7 Special Provisions
- b. Part 3 General Conditions
- c. Part 2 Information for Bidders
- d. Part 8 Detailed Specifications
- e. Part 5 General Construction Specifications
- f. Part 6 Workmanship and Material Specifications

2. Additions to the General Conditions

2.1 Article 13 - Changes in the Work

Under Article 13, paragraph 13.1 the sentence reading "If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER" shall be changed to read:

"If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER and no other method."

In addition, the following sentence shall be added directly following the above correction: "The CONTRACTOR specifically agrees that no action for equitable adjustment may be brought unless the CONTRACTOR has secured a CHANGE ORDER signed by the OWNER prior to the commencement of the WORK covered by such CHANGE ORDER."

2.2 Article 19 - Payments to Contractor

Under Article 19, paragraph 19.1 the sentence reading: "The OWNER will, within ten (10) days of presentation of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retainage", shall be changed to read: "The OWNER will, within thirty (30) days of presentation of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retainage."

In addition, the following shall be added to paragraph 19.1:

The establishment of an Escrow Account between the Owner and the successful bidder(s) for the retainage will be left to the sole discretion of the successful bidder(s).

2.3 Article 32 - Detailed Breakdown of Contract Amounts

Identified as Article 32, the following shall be included to the General Conditions:

The Contractor shall furnish, the Engineer reasonable facilities for obtaining such information as he may desire respecting the progress and execution of the work and the character of materials. The Contractor shall, upon request, furnish the Engineer with copies of expense bills for transportation charges, materials and equipment. In the event of cost-plus limited work as authorized in writing by the Owner, the Contractor shall submit daily payrolls and equipment ownership/rental charges in addition to the cost of materials.

Except in cases where unit prices form the basis of payment under the Contract, the Contractor shall; within ten (10) days of receipt of the Notice of Award, submit a complete breakdown of the Contract Amount showing the value assigned to each part of the work, including as a minimum labor, material, equipment, sub-contracts, mobilization, overhead and profit. Upon acceptance of the breakdown of the Contract amount by the Engineer, it shall be used as the basis for all Requests for Payment and Change Order negotiations as applicable.

3. Tentative Award of Contract

The Owner may elect to make tentative award of contract, pending the sale of bonds or the completion of other financing arrangements. In such event, and upon successful completion of the necessary arrangements to finance the cost of the project, the Owner and the successful bidder to whom the tentative award has been made shall enter into a written contract at the price stated in the proposal and as specified; provided that the elapsed time from the date of the tentative award shall not exceed the period as set forth in the proposal form. The time for execution is mutually agreeable to the Owner and the successful bidder.

4. Quality Control Plan

The Contractor shall provide and maintain an effective quality control program. This program shall establish a means to perform sufficient inspection and tests of conformance to applicable Specifications and Drawings with respect to the materials, workmanship, construction, finish, functional performance and identification. This control will be established for all construction. Copies of inspections, reports, and testing results shall be mailed to the Engineer's office by the Quality Control Organization through the Contractor. When submitted for the Engineer's records, the reports and/or test results shall bear the Contractor's certification that he has reviewed, checked and approved the reports and/or test results and that they are in conformance with the requirements of the Contract Documents.

The Contractor shall furnish the Engineer within thirty (30) days after receipt of the Notice to Proceed a quality control plan which shall include the procedures, instructions and reports to be used. This document will include as a minimum:

- A. The quality control organization;
- B. Authority and responsibilities of quality control personnel;
- C. Methods of quality control, including that for his Subcontractor's work;

- D. Test methods including, as specified, name of qualified testing laboratory to be used;
- E. Method of documenting quality control operation, inspection and testing.

5. Overtime Payment

All premium overtime expense incurred by the Engineer/Inspector and/or his representatives on account of the Contractor's construction forces working beyond forty (40) hours per week, Saturdays, Sundays and/or Holidays as scheduled by the Owner shall be paid by the Contractor to the Engineer. Payments shall be made monthly based on the Engineer's detailed invoice to the Contractor. If the Contractor fails to make any payments due the Engineer within thirty (30) days from the date of the Engineer's invoice, then the Engineer shall be entitled to interest at the rate of 1-1/2% per month (but not exceeding the maximum rate allowable by Indiana law) from said 30th day.

6. Authority and Duty of Resident Project Representatives (Inspectors)

The Resident Project Representatives employed by the Owner are stationed on the work to:

- A. Keep the Engineer/Owner informed as to the progress of the work and the manner in which it is being done.
- B. Report whenever it appears that the materials furnished and the work performed by the Contractor fail to fulfill the requirements of the Specifications and Contract.
- C. Call to the attention of the Contractor any deviation from or infringement upon the Plans and Specifications.
- D. Check and verify that Contractor is keeping and maintaining Project As-Built Drawings.

Resident Project Representatives shall be authorized to inspect all work done and materials furnished and to exercise such additional authority as may be delegated to them in writing by the Engineer. Such inspection may extend to all or any part of the work done and material furnished. They shall have authority to reject defective material and to suspend any work that is being done improperly, subject to the final decisions of the Engineer.

Such inspection shall not relieve the Contractor from any obligation to furnish acceptable materials or to perform all work strictly in accordance with the requirements of the Plans and Specifications.

Resident Project Representatives shall not be authorized to revoke, alter, enlarge, relax or release any requirements of the Specifications, nor to approve or accept any portion of the work, nor to issue instructions contrary to the Plans and Specifications. They shall, in no case act as foremen or perform other duties for the Contractor nor interfere with the management of the work by the latter. Any advice which inspectors may give the Contractors shall in no way be construed as binding the Engineer or the Owner in any way, or releasing the Contractor from the fulfillment of the terms of the Contract.

The Owner, the Engineer and his authorized representatives will at all times have access to the WORK, to determine if the WORK is proceeding in accordance with the Contract Documents. If in the opinion of the Owner, the Engineer and his authorized representatives, the WORK is not proceeding in accordance with the Contract Documents, or the Contractor is utilizing undesirable construction practices, the Owner, the Engineer and/or through his authorized representatives, may direct the Contractor to cease WORK and correct all defective work and undesirable construction practices. The Contractor will bear all expenses for correcting defective work, and will bear any and all monetary losses and expenses relating to and resulting from ceasing of WORK because of defective work. Such expenses to also include compensation to the Owner for non-productive inspection expenses during the time lost while correcting defective work, the Contractor will not be granted an extension of the project scheduled completion time.

7. Proposals for Equipment and Materials

Proposals for the various equipment and materials to be furnished and installed shall conform with the specifications for all bid items, with respect to general design, performance, materials of construction, workmanship, overall functions, testing and accessories.

Where the names of two (2) manufacturers are specifically mentioned in the Detailed Specifications and followed by "or equal", the bidders may bid on either of the two (2) named manufacturers or on any alternate proposal, equal or superior to the two (2) named manufacturers, provided that the "or equal" conforms with the requirements of these Contract Documents.

Whenever equipment other than that named specifically in the Specifications and shown on the Plans is proposed in the proposal, the Contractor shall include in his bid on such "or equal" equipment:

- A. The cost of redesign of any mechanical, electrical and/or structural changes necessary to make the "or equal" equipment to comply with the ratings, loadings, dimensions, etc., prescribed herein;
- and
- B. Any increase in the cost of structures, piping, electrical and/or mechanical appurtenances involved by the proposed "or equal" equipment.

8. Landmarks and Monuments

The Contractor, nor any of his employees, shall not molest or remove monuments or landmarks without the written consent of the Owner. Any monument or landmark so removed shall be replaced at the expense of the Contractor. The cost thereof shall be retained from the monies due or to become due the Contractor under this Contract.

9. Guaranty

In addition to all materials and workmanship, all sod, seed, trees, shrubs, bushes, flowers, etc., which are placed, sowed, planted or replanted by the Contractor to replace same destroyed or damaged by his operations, shall be guaranteed for a period of one year from the date of the Certificate of Substantial Completion of the work under this Contract.

Should any of the above die or fail to grow, it shall be replaced, resown, or replanted at no cost to the Owner.

10. Use of Chemicals

All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in conformance with instructions.

11. Definitions

In the case of this Project, the Owner is the Shafer-Freeman Lakes Environmental Conservation Corporation and the Engineer is Commonwealth Engineers, Inc., of Indianapolis, Indiana.

12. Insurance Coverage

The Contractor shall purchase and maintain such insurance coverage sufficiently broad to insure the Owner, the Engineer, their consultants and each of their officers, agents and employees as additional named insured under the requirements of Paragraph 21 of the General Conditions.

13. New Materials and Equipment

Unless otherwise specifically permitted by the Specifications, all material and equipment used on this Project shall be new and un-used.

14. Differing Site Conditions Notification

The Contractor shall promptly and before such conditions are disturbed, notify the recipient in writing. The recipient in this case shall mean the Owner not the Engineer.

15. Substantial Completion and Liquidated Damages

The time for completion and liquidated damages is defined in Section 15 of the General Conditions. For purposes of clarification, liquidated damages will begin if the work is not fully complete within the Contract time. Issuance of a Certificate of Substantial Completion with items of work still outstanding will not stop liquidated damages.

16. Revisions to Construction Schedule and Time Extension Requests

The Contractor shall submit to the Engineer with each monthly progress payment request an updated construction schedule for the Engineer's review and approval. In addition and when applicable, the Contractor shall also submit with each monthly progress payment request any and all documentation necessary for any time extension that may be justified in the Contractor's opinion and due to conditions encountered during the period for which the claim is being filed. A Change Order will then be prepared for this claim as soon as it is approved by the Owner and Engineer.

Requests for time extensions made after the above specified period and not reflected in the updated construction schedules previously submitted shall not be considered.

17. Withholding of Construction Payments

The Engineer may recommend to the Owner and the Owner may withhold, or on account of subsequently discovered evidence, nullify the whole or part of any estimate to such extent as may be necessary to protect the Owner from loss on account of:

- a. Defective work not remedied;
- b. Claims filed or reasonable evidence indicating probability of the filing of claims;
- c. Failure of the Contractor to make payments properly to sub-contractors or material suppliers for which the Contractor has been paid by the Owner;
- d. A reasonable doubt that the Contract can be completed for the balance then unpaid;
- e. Damage to another Contractor;
- f. Failure of the Contractor to keep his work progressing in accordance with his time schedule;
- g. Performing of work in violation of the terms of the Contract.

18. Night and Sunday Work

No night or Sunday work requiring the presence of the Engineer or the Resident Project Representative will be permitted unless the Engineer has been given seven (7) days written notice. The Contractor will be responsible pursuant to Section 6 of these Special Provisions for all overtime (premium) expense incurred by the Engineer for night or Sunday work.

19. Established Construction Techniques

All construction techniques and specialized equipment used to complete the work under this Contract shall be only those established as suitable and effective by extensive prior use in similar work. Unproven or experimental techniques shall be allowed only with written permission from the Engineer. Upon receipt of written request from the Engineer, the Contractor shall submit detailed documentation to establish the qualifications of any technique or specialized equipment being employed to complete the work. Minimum documentation shall include not less than three (3) references where the procedure has been employed in similar work and under similar circumstances. Each reference shall include the location, date, project owners name and address and the name and telephone number of a person to contact for a technical reference. Techniques and/or equipment adjudged by the Engineer to be unsuitable and/or unproven shall be immediately discontinued. Work performed utilizing these techniques shall be reworked by the Contractor at his expense and as directed by the Engineer.

20. Shop Drawings

In addition to the requirements relative to Shop Drawings as contained in Paragraph 5 of the General Conditions and Paragraph 16 of the General Construction Specifications, the Contractor shall also meet the following requirements:

20.1 Shop Drawing Submission

Within ten (10) days after being notified by the Engineer as to the Shop Drawings required for the Project, the Contractor shall submit to the Engineer a preliminary schedule of Shop Drawing submissions.

The finalized Shop Drawing Schedule shall be submitted to the Engineer within ten (10) days after the Contractor has received the Engineer's comments relative to the preliminary schedule.

20.2 Shop Drawings

After checking and verifying all field measurements and after complying with the applicable procedures previously specified, the Contractor shall submit to the Engineer for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see 20.1 above), six (6) copies of all Shop Drawings, which will bear a stamp or specific written indication that the Contractor has satisfied the Contractor's responsibilities under the Contract Documents with respect to review of the submission. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable the Engineer to review the information as required.

20.2.1 Before submission of each Shop Drawing or sample, Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the work and the Contract Documents.

20.2.2 At the time of each submission, Contractor shall give Engineer specific written notice of each variation that the Shop Drawings or samples may have from the requirements of Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

Engineer will review and approve with reasonable promptness Shop Drawings and samples; but Engineer's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of separate items as such will not indicate approval of the assembly in which the item functions. Contractor shall make corrections required by Engineer, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

Engineer's review and approval of Shop Drawings or samples shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called the Engineer's attention to each such variation at the time of submission as required by paragraph 20.2.2 and Engineer has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by Engineer relieve Contractor from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 20.2.1.

Where a Shop Drawing or sample is required by the Specifications, any related work performed prior to Engineer's review and approval of the pertinent submission will be the sole expense and responsibility of Contractor.

21. Hazard Communication Standard

Pursuant to the Code of Federal Regulations, 29 CFR Part 1926, as may be amended, all Contractors, Subcontractors and materials suppliers on this Project shall provide access to all persons on the job site at all times, the Material Safety Data Sheets (MSDS) for all hazards of all chemicals per the Federal Regulations.

In addition, contractors, sub-contractors and material suppliers shall provide training to their employees on the MSDS pursuant to the Federal Regulations.

22. Excavation Safety Requirements

It shall be the duty and responsibility of the Contractor and all of its Subcontractors to be familiar and comply with all requirements of Public Law 91-596 29 U.S.C., Sections 651 et. seq., the Occupational Safety and Health Act of 1970 (OSHA) and all amendments thereto and to enforce and comply with all of the provisions of the Act. In addition and as required by Indiana State Law, HB 2071, Section 14. of IC 4-13.6-5-12, the Contractor and all of its Subcontractors shall comply with Subpart P of 29 CFR 1926 dated October 31, 1989 as may be amended.

Costs of all Excavation Protection shall be included in the Bid.

23. Products in Contact with Potable Water

Any treatment chemical, any material used in the manufacture of public water system components or appurtenances; any pipe, storage tank, valve, fixture or other materials which come into contact with water intended for use in a public water system shall be certified for conformance to ANSI and/or NSF 60 & 61. Any products not certified for compliance to ANSI/NSF 60 & 61 but appearing on the Advisory List published by the U.S. EPA shall not be used.

24. Project Site Erosion Control

The Contractor shall be responsible to comply with all aspects of 327 IAC 15-5, Rule 5, "Storm Water Run-Off Associated with Construction Activity". The Contractor shall submit all necessary fees and documents to the Indiana Department of Environmental Management (IDEM) prior to any construction activity. The Contractor shall be responsible for compliance with this Law throughout the construction period and shall pay any and all fines resulting from any violation, suit or penalty for non-compliance.

25. Confined Space Access

For projects which include construction activities within "confined spaces" as defined in Title 29 CFR Part 1926.21(b)(6), the Contractor is hereby advised that he must fully comply with all pertinent requirements as delineated in this regulation and as interpreted by OSHA. The Contractor shall have and maintain all necessary safety and testing equipment at all times during the course of the construction activity. In addition, it shall be the Contractor's responsibility to make this equipment available for use by the Owner or the Owner's Representative on the project site. If the Owner or the Owner's Representative requires

the use of this equipment during the course of observing or verifying the construction, it shall be made available in a timely fashion. If the Owner or the Owner's Representative is unable to observe or verify a portion of the construction due to a lack of the necessary safety or testing equipment, any resulting delays and/or expenses shall be the responsibility of the Contractor.

This equipment shall include a gas monitor capable of detecting oxygen, combustibles, and toxics including carbon monoxide and hydrogen sulfide. A metal oxide (broad based) sensor may be used in lieu of the individual carbon monoxide and hydrogen sulfide sensors. Contractor shall provide gas monitor calibration certifications to Engineer to verify proper maintenance.

26. Wage Scale

This Project has no established wage scales.

27. Permits

The following list of Permits (to be provided by Addendum) are to be incorporated into these Special Provisions to insure that all requirements of the Permits are known by the Contractor prior to bidding. Any provision of these Permits which conflicts with the Plans and Specifications must be adhered to.

- IDNR
- USCOE Section 404

28. Adverse Weather Delays

Unusually severe weather must actually cause a delay to the completion of the project to be considered as such. The delay must be beyond the control and without the fault or negligence of the Contractor. The following schedule of monthly anticipated adverse weather delays is based on the National Weather Service or similar data for the project area and will constitute the baseline for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

Monthly Anticipated Adverse Weather Delay
Work Days Based On (5) Day Work Week

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(14)	(9)	(7)	(5)	(6)	(4)	(4)	(4)	(4)	(4)	(5)	(9)

Upon acknowledgment of the Notice To Proceed and continuing throughout the contract, the Contractor shall record the occurrence of adverse weather and the resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in the previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated herein, the Owner may convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days.

29. Payment to Contractor

Partial payments will be made to the Contractor as specified in Part 3 "General Conditions", page GC-10, item 19 "Payment to Contractor". In addition to the requirements of the General Conditions for partial payment to the Contractor, the Contractor shall be required to submit a copy of the partial payment request to the Contractor's surety for their review, not less than 10 days prior to the Owner's approval of the pay request, indicating a request for payment for work which may not have been tested in accordance with final acceptance procedures for said work. The Contractor shall include a statement on each monthly partial payment request indicating the pay request has been sent to the Contractor's surety and the Contractor shall attest to this by signing the pay request.

PART 8

DETAILED SPECIFICATIONS

PART 8

DETAILED SPECIFICATIONS

AREA 1: HONEY CREEK

DIVISION "A" - LAKE DREDGING CONTRACT

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SECTION 0

GENERAL

DETAILED SPECIFICATIONS

1. GENERAL

- 1.01 Scope of Detailed Specifications - The Detailed Specifications part of the Contract describes equipment, material, labor, services, and other provisions of the Contract which must be provided and met by the Contractor and which supersede the General Construction Specifications, Part 5, and the Workmanship and Materials Specifications, Part 6, of the Contract where the provisions of these Parts are in conflict.
- 1.02 Scope of this Section - This Section contains provisions which are applicable to all Detailed Specifications or are of a general nature.
- 1.03 Contractor's Responsibility - The Contractor shall furnish all materials, labor and equipment for the Work described under this Specification.
- 1.04 Method of Construction - Due to the nature of this project a hydraulic dredging method of lake excavation has been assumed for these Detailed Specifications. The contractor will be responsible for working under these conditions and for supplying and installing materials by dredge, barge, crane, conveyor etc. or whatever will be needed to complete the project. It must be recognized that draining portions of tributary lake areas has been considered, but due to resulting wet soil conditions and the uncertain drying time needed, it should be recognized that the use of "heavy-highway" type construction equipment may be limited.
- 1.05 Payment - The lump sum prices stated in the Contract for the respective Items shall be payment in full for the completion of all work specified and described to be included in the respective Items, complete and ready for use and operation, including testing, as shown on the plans and as specified.

2. CONTINUITY OF PUBLIC SERVICES

- 2.01 The Project may involve the excavation and placement of spoil material close to existing utilities. Certain portions of the work must be accomplished within rights-of-way, and traffic flow must be maintained. Therefore, it is necessary that all work be performed in such a manner so as to provide to the greatest extent reasonably possible, a continuous service of potable water and other utilities, and the flow of traffic on public streets. The Contractor shall be fully responsible for, and shall provide, any and all temporary piping, pumping, controls, electrical, containment and transportation equipment, and other equipment and work so as to maintain these public transportation and utility services. This may include but not be limited to the installation of temporary culvert structures.

3. **NOTICE OF STREET CLOSINGS**

- 3.01 Contractor shall give Engineer and Owner and the respective utility or authority notice at least seven (7) days prior to the temporary discontinuation of service, or temporary closing of all or parts of streets. Such notice shall specify the locations of temporary service discontinuation or street work, the estimated time that the work will require to complete, and the extent, whether partial or complete, that any streets are anticipated to be closed.

4. **COMPLETION OF WORK AND LIQUIDATED DAMAGES**

- 4.01 **Scope** - This Section defines the Time for Completion, also called Contract Time, and the Liquidated Damages under the Contract Documents.

4.02 **Time for Completion and Liquidated Damages**

- a. **Time for Completion of Contract** - The Contractor shall substantially complete the work and have the work substantially complete and ready for use in conformance with Part 9, "Bid Proposal Documents".
- b. **Time is of the Essence** - It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion of the work as specified in the Contract Documents are essential conditions of this Agreement.
- c. **Rate of Progress** - The Contractor agrees that said work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will insure full completion thereof within the contract time.
- d. **Liquidated Damages** - If the Contractor shall neglect, fail or refuse to complete the work within the Contract Time, or any proper extension thereof granted by the Owner, then the Contractor does agree, as a part consideration for the awarding of the Contract Documents, to pay to the Owner the amount specified in the Agreement, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every day that the Contractor shall be in default after the expiration of the Contract Time. The amount of liquidated damages specified in the Agreement is **Five Hundred Dollars (\$500.00)** for each calendar day that the work remains uncompleted after the time stipulated for completion in these Contract Documents.

The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages which the Owner would sustain and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

- e. Exceptions to Liquidated Damages Provision - It is further agreed that time is of the essence of each and every portion of this Agreement and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where, under the Contract Documents an additional time is allowed for the completion of any work, the new time limit fixed by such extensions shall be the essence of this Agreement. Provided, that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; provided further, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

1. To any preference, priority or allocation order not specified in the Contract Documents and duly issued by any governmental entity;
2. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather, taking into consideration the climatic range of the preceding ten (10) year period; or
3. To any delays of subcontractors or suppliers occasioned solely by any of the causes specified in 1. and 2. of this subsection; and
4. The event directly caused the delay and the delay occurred despite the Contractor's best efforts to reorganize his work effort to avoid the delay.

Provide further, that the Contractor shall, within ten (10) days from the beginning of such delay, unless the Owner shall grant in writing a further period of time prior to the tenth (10th) day after the beginning of such delay, notify the Owner, in writing, of the causes of the delay. Thereafter, Owner shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

5. USE OF EASEMENTS

- 5.01 Notwithstanding, anything to the contrary in these Contract Documents, the Contractor shall limit its work in and around easements to comply with those specific rights provided under the easements. Copies of easements are available from the Owner upon request. In the event Owner or the owner of the land on which the easement exists is damaged by Contractor's work in or around the easement, Contractor shall be fully responsible for restitution for the damage.

6. PRODUCT

- 6.01 General** - Temporary fittings, fixtures, products, labor and workmanship necessary under this specification to accomplish testing shall meet all requirements of applicable specifications under this Contract.

7. PROJECT FIRST AID FACILITIES

- 7.01 The Contractor shall comply with the requirements for all local, State and Federal agencies having jurisdiction for temporary first aid facilities for construction sites.
- 7.02 The Contractor shall insure the availability of medical personnel for advice and consultation on matters of occupational health.
- 7.03 The Contractor shall make provisions prior to commencement of the work for prompt medical attention in case of serious injury.
- 7.04 An area that, when needed, can be segregated from other activities shall be designated specifically as a first aid station, and equipped as required to fulfill these requirements.
- 7.05 In the absence of an infirmary, clinic, hospital, or physician that is reasonably accessible in terms of time and distance to the work site, which is available for the treatment of injured employees, a person who has a valid certificate in first aid training from the U.S. Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentary evidence, shall be available at the work site to render first aid.
- 7.06 First aid supplies approved by the consulting physician shall be easily accessible when required.
- 7.07 The first aid kit shall consist of materials approved by the consulting physician in a weatherproof container with individual sealed packages for each type of item. The contents of the first aid kit shall be checked by the Contractor at least weekly and at the time the expended items are to be replaced.
- 7.08 Proper equipment for prompt transportation of the injured person to a physician or hospital, or a communication system for contacting necessary ambulance service, will be provided.
- 7.09 The telephone numbers of the physicians, hospital, or ambulances shall be conspicuously posted.

8. INDIANA DEPARTMENT OF TRANSPORTATION (INDOT) STANDARDS

- 8.01 Miscellaneous INDOT Standards and Detailed Specifications are to be used in conjunction with the contract plans. The INDOT specifications are intended to be used only for material and installation specifications and not to supersede contract language or methods of measurement or payment described elsewhere in these specifications.

9. **COORDINATION OF WORK WITH OTHER DIVISION CONTRACTORS**

- 9.01 General. Since the project will consist of two (2) divisions, Division A, Dredging Contract and Division B, Sediment Placement and Dewatering Site Contract, each contractor shall coordinate their work with each other.
- 9.02 It shall be understood that the sediment placement site must be completed before dredge pumping operations can begin.
- 9.03 Due to the limited rate of settling in the dewatering basin, the Contractor under the Division A Contract shall account for the limitations on how much slurry can be pumped into the dewatering basin. This will require that the dredger also maintain an optimal dredging efficiency in order to minimize the amount of water introduced into the dredge pump.
- 9.04 The Division A Contractor shall account for weather limitations that may be placed on the Division B Contractor. However, the Division B Contractor shall also account for the historic average number of adverse weather days for the project area. Refer to Special Provisions Part 28 "Adverse Weather Delays".

SECTION 1

MOBILIZATION, BOND, AND OTHER

1. GENERAL

1.1 Scope

The Contractor shall furnish all labor, equipment and materials necessary for mobilization and demobilization to the project site(s) and for maintaining written progress reports for work completed each day as required by the Owner. This work shall also include the expense related to the purchase of required insurance and bonds and cost for pre-construction audio-video survey. In addition, the cost for all work items not specifically included under the other pay items shall be included in this Section.

1.2 Payment

Payment shall be a lump sum for the work specified in this section as well as for all work items not specifically included under other pay items.

2. PRODUCT

2.1 Progress Reports

The Contractor shall maintain a written daily progress report of work performed. The purpose of the progress report is for tracking the depth and the approximate location of sediment that is dredged and placed each day. Work will be inspected by the Owner from time to time and compared with work completed as noted in the daily progress report. A sample of this report is included at the end of this section.

2.2 Insurance and Bonds

Required insurance and bonds shall be as set forth in Part 2 - "Information for Bidders", Part 3 - "General Conditions", and Part 7 - "Special Provisions".

2.3 Pre-Construction Audio-Video Survey

A. General

1. Prior to construction, the Contractor shall tape all visible construction areas which will be disturbed by the Contractor to document the condition of the area. The purpose is to establish conditions prior to construction.
2. The product shall be high quality audio and video tape. The video portion shall present bright, sharp, clear pictures with accurate colors. The picture shall be free from distortion, tearing, rolls or other picture imperfection. The audio portion shall be proper volume, clarity and free of distortion. The audio commentary shall be precise and concise explanatory notes.

B. Camera

Where the area to be taped is accessible by conventional wheeled vehicles, the video camera shall have a horizontal resolution of 500 lines at center. For areas non-accessible by conventional vehicles, the color video camera shall have a horizontal resolution of at least 300 lines at center. The tapes shall be high quality color VHS.

2.3 Monitoring and Positioning Equipment

As part of this item, dredging or other excavation equipment should consider appropriate instrumentation including sensors, indicators and controllers. In addition to instrumentation, the contractor shall utilize a horizontal positioning system for locating all dredging equipment and depth measurements.

3. EXECUTION

3.1.1 Audio

The audio part of the tape shall provide a precise and concise summary. An audio summary shall be provided at the beginning of each tape, at each street, and at intervals of not more than 100 lineal feet. Audio summary shall include tape number, job title, job location, positional location, date and time, weather and any other notable condition.

3.1.2 Coverage

The recordings shall include coverage of all surface features located along the main route. The tape coverage shall include all existing cross streets, driveways, sidewalks, curbs, ditches, shrubbery or other structures located along the route.

3.1.3 Taping Procedures

- A. The rate of speed of the vehicle used for taping shall not exceed 48 feet per minute. Camera elevation from ground shall be 12 feet or greater.
- B. Recording shall only be done during periods of sufficient sunlight. No recording shall be done during periods of significant precipitation, mist or fog.
- C. The operator shall have had experience video documenting at least 50 miles of pre-construction work.
- D. The recording shall be completed prior to the start of construction and the placement of any construction materials or equipment on the proposed site. However, work shall not proceed commencement of work by more than seven (7) weeks.

3.1.4 Delivery

- A. The video tapes shall be delivered to the Owner prior to the start of construction. Any recordings not conforming to the specifications may be rejected with retaping to be done at no additional cost to the Owner.
- B. The video tapes shall be delivered in storage cases. Each tape shall be properly labeled. An index shall describe the contents of each tape.

3.2.1 Position Monitoring

- A. The contractor shall utilize plan verifiable reference points shown on the plans. These shall include points around the proposed excavation areas for sediment trap construction and also points around placement and containment areas.
- B. Positioning information shall be taken and recorded no less than four (4) times per day for both dredging equipment and that piping and/or equipment located on the four (4) times per day for the sediment placement site. This shall include positioning information prior to beginning and ending dredging operations each day, plus two other randomly times as may be selected by the Owner. This information is to be used for confirming work completed to date for partial pay estimates and for inspection purposes required by the Owner. All progress report records are to be submitted to the Owner on a weekly basis.
- C. Acoustic sounding (Sonar) devices with printout capabilities may be used for establishing both before and after dredging depths. This information may also be taken when positioning information is acquired. Calibration of these devices will also be required. All records are to be submitted to the Owner on a weekly basis.
- D. Positioning and sounding information shall be provided to outline the limits of excavation performed and shall be verifiable by the Owner.

SECTION 2

DREDGING

1. GENERAL

- 1.01 The Contractor shall furnish all labor, materials, equipment, tools, pumps, dredge suction and pumping lines, marine equipment including but not limited to dredges and barges and other equipment, and shall do all work necessary for all excavations and backfilling, fills and embankments, final grading and other work as required for the construction of sediment traps, as shown on the plans and as specified, except work specifically included under other Contract Items.
- 1.02 The dredging and related work under this Section shall be performed as specified herein and in compliance with the following Workmanship and Materials Specifications.
- a. Excavation
 - b. Backfill, Fills and Embankments
 - c. Laying of Sewers
- 1.03 Construction operations shall be carried out in such a manner and sequence that erosion and air and water pollution will be minimized and held within acceptable limits. Construction methods that enhance fish and wildlife will be used where practical. Trees, stumps, and brush removed from the construction area may be piled for fish and wildlife habitat when approved by the Owner, landowner, and Engineer. It is important that material excavated from this project be contained.

The maximum effluent level of suspended solids for this project is 2 grams per liter.

- 1.04 The completed job shall present a workmanlike appearance and in reasonable conformance to the line, grades, and elevations shown on the drawings.
- 1.05 All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. This is particularly critical for this project since many boaters and general public may be in the immediate area of construction activities.

2. WORK INCLUDED

- 2.01 The work includes above and below water excavation for hydraulically dredging lake bottom sediments, shaping and placement of erosion and sediment control materials, grubbing, stripping and clearing all areas on which the work is to be done or temporary access is required; protection of all existing and new structures, piping, conduits, excavation, subsoil and topsoil, stockpiling, sheeting, shoring, and bracing, cofferdams, dikes, draining, pumping, handling and disposal of water from the excavations; backfilling; and other operations as specified and required to complete the dredging.

- 2.02 The Contractor for this, Division A, Dredging Contract will be responsible for installing all pressurized inflow discharge pipelines up to the point of discharge in a dewatering basin to be constructed by the Contractor under the Division B, Sediment Placement Site Contract. The Division B, Sediment Placement Site Contractor will install all on-site dewatering structures and an outflow discharge pipeline back to the waters edge of the lake as shown on the plans. The Division A, Dredging Contractor will be responsible for the outlet discharge pipeline within the lake area from the waters edge through the lake. Both contractors shall be responsible for coordinating the connections between each pipeline.

The Division A Dredging Contractor shall drain the effluent to an off-site location utilizing an enclosed pipeline back to Lake Shafer. In order to reduce conflicts and protect the general public, the pipeline shall be directed into and below the water surface to a depth of no less than 4 feet. The pipeline shall be extended as shown in the plans away from the Isle of Homes area to a point at least 100 feet west from the extended east shoreline of Lake Shafer. The pipeline shall be pointed downward at the exit point and extended further downward for a distance of at least 4 feet but no closer than 2 feet above the lake bottom, whichever is the lesser distance, in order to minimize turbulence. Disturbance of mussel beds and similar aquatic areas shall be avoided to the extent possible.

- 2.03 All pipelines and related dredging equipment located within public waterways shall include safety yellow flotation devices, buoys and flagging, together with automatic on at dusk-off at dawn flashing warning lights and as required by law. All cable systems placed over and /or under water shall also be marked with similar safety devices. Cable systems placed over water shall not be placed any lower than 14 feet above the water surface.
- 2.04 Excavated materials to be later used for fill or filler topsoil shall be stockpiled and used to make the fills and embankments as shown on the plans and in compliance with Section VM-3 of the Workmanship and Materials Specifications. Backfilling shall be done in a manner to avoid any undue structural loading on structures. Stockpiles shall be located so as to avoid interference with access to project areas and to least interfere with other contractors performing work on behalf of the Owner in the same vicinity and as approved by the Engineer.
- 2.05 The work shall be performed in such a manner so as to prevent damage to existing structures, including piping, that are to be retained. Soil boring logs and geotechnical recommendations are available for review in these specifications.

3. SUBSURFACE CONDITIONS

- 3.01 Borings and other investigations that have been made are included at the end of the previous Section 2. The information given in these logs applies only to conditions encountered at the indicated locations and to the depths shown. The Contractor shall examine the site personally and make such additional investigations as he may deem necessary for estimating costs, planning and execution of the work.

4. EXECUTION

- 4.01 The method of removal and disposal and equipment to be utilized shall be outlined in the Contractor's Plan of Operation to be submitted to the Owner prior to initiation of the actual work. The placement of sediment for this project shall be by the confined disposal method. Material shall be discharged into confined disposal sites by floating or burying pipelines and overland discharge pipelines.
- 4.02 Due to the nature of this project a hydraulic dredging method of lake excavation has been assumed for these specifications. The contractor will be responsible for working under these conditions and for supplying and installing materials by dredge, barge, crane, conveyor etc. or whatever will be needed to complete the project. It must be recognized that draining portions of tributary lake areas has been considered, but due to resulting wet soil conditions and the uncertain drying time needed, it should be recognized that the use of "heavy-highway" type construction equipment may be limited for lake dredging.
- 4.03 The contractor shall account for the following when excavating utilizing a hydraulic dredge. The factors to be used in this evaluation shall include but not be limited to:
1. Material to be Pumped
 2. Digging Depth
 3. Terminal (Discharge) Elevation
 4. Discharge Line Length
 5. Cutter Capability
 6. Height of Work Face
 7. Swing Width
 8. Type of Advancing Mechanism
 9. Dredge Efficiency
 10. Suction Line Size
 11. Hourly Production Rate
 12. Total Project Volume
 13. Production Time Required
 14. Calendar Time Required
 15. Trash vs. Production Time
 16. Operational Costs
- 4.04 The effectiveness of dewatering hydraulically pumped sediments is dependent upon the physical material being pumped into the dewatering facility and the amount of water being pumped with the dredged sediments. It is important that the Division A Dredging Contractor monitor the production rate of their dredging operation so that they do not unduly flood the dewatering basins. The Division A Dredging Contractor shall account for down time in their bid in order for the material to be adequately dewatered.
- 4.05 Although hydraulic dredge requirements may vary with each type of equipment, the following project conditions are provided for this project to assist the Contractor in estimating his work:

- | | | |
|----|-----------------------------|---|
| 1. | Material to be Pumped: | See Soils Borings/ Conduct Additional Soils Investigations Prior to Bid |
| 2. | Digging Depth: | 0 to 4 feet |
| 3. | Lake Elevation: | 070.65 (Assumed plan datum)
645.1 MSL (Per Norway Dam Records) |
| 4. | Terminal (Discharge) Elev.: | 100.0 (Assumed plan datum) |
| 5. | Discharge Line Length: | 1,500 to 3,700 feet |
| 6. | Estimated Quantity: | 23,600 cubic yards |

- 4.06 Sediment Excavation. All areas to be hydraulically dredged shall create a cut no steeper than 5 horizontal to 1 vertical.
- 4.07 Special attention shall be given to protecting and maintaining key shade, food, den and trees, and visual resources. Trees to be left standing and uninjured within the clearing limits shall be marked by the contractor for verification by the Owner. Removal of any trees and brush shall be done in such a manner as to avoid damage to other trees and property. All loose downed trees, logs, drifts, boulders, debris, and other obstructions lying wholly or partly in the area to be excavated shall be removed.
- 4.08 If excavated areas are located in cultivated areas or in areas of high value land, trees, logs, and all combustible material resulting from the clearing and snagging operations shall be burned or buried in approved areas out of the project limits as specified for the project. All burning shall conform to regulations in effect in the area. In other areas, such as woodland or rangeland, where burning is prohibited, material shall be removed from the site. Residue from burning and noncombustible material shall be removed from the site. All buried material shall have an adequate earth cover to permit land use.
- 4.09 Vegetation shall be established on all disturbed areas such as channel slopes, berms, spoil, disposal and other areas except when bank materials or land use conditions are such that vegetation is impractical and authorized by the Owner. Disturbed areas are to be final graded and seeded as soon as possible after exposure. Gullied and uneven areas will be smoothed before attempting to prepare seedbed. Upon finish grading of work area, the Contractor shall permanently seed and stabilize all final grade areas above the water line (see Detailed Section 9, Seeding & Sodding).
- 4.10 The Contractor shall consider all material to be encountered in this project. This shall include but not be limited to submerged tree stumps.

6. QUALITY CONTROL

- 6.01 In order to assure that the effluent being discharged back to the lake will be relatively free of excessive sediment, a system of measuring the amount of Total Suspended Solids (TSS) in the effluent is required by the Division B, Sediment Placement Site Contractor. As stated earlier, **the maximum effluent level of suspended solids for this project is 2 grams per liter**. Should sampling indicate an unsatisfactory effluent, the Division B, is required to notify the Owner and the Division A, Dredging Contractor. Likewise, should the Division A, Dredging

Contractor notice any questionable effluent, they shall also be required to notify the Owner.

- 6.02 The effectiveness of dewatering hydraulically pumped sediments is dependent upon the physical material being pumped into the dewatering facility and the amount of water being pumped with the dredged sediments. It is important that the Division A Dredging Contractor monitor the production rate of their dredging operation so that they do not unduly flood the dewatering basins. The Division A Dredging Contractor shall account for down time in their bid in order for the material to be adequately dewatered.
- 6.03 Should waters surrounding dredging operations become turbid or contain objectionable oils, floating turbidity control curtains and oil spill containment booms shall be used. Contractors shall consider use of environmentally safe oils. Turbidity curtains shall consist of the following or better:
- a. Fabric: Polyester reinforced vinyl high visibility yellow
 - b. Connector: Sections to be laced together through grommets
 - c. Flotation: 6 inch expanded polystyrene over 9 lbs/ft. buoyancy
 - d. Ballast: 1/4 inch galvanized chain (0.7 lbs/ft.)

- 6.04 Dredger Positioning. In order to confirm the position of dredging operations for record and payment information, the Division A Contractor shall be required to utilize a horizontal positioning system for locating all dredging equipment and depth measurements. The Dredging Progress Report is to be used for recording this information.

The Report contains two columns for "Location" with a "North" and an "East" coordinate to be logged to the nearest foot. The intent is to have a relatively simple procedure for locating the dredge for a given time. Although a Geographic Positioning System (GPS) would accomplish this, it is not required for this project. However, the Contractor for Division A is required to establish a grid system using plan identifiable points. The north and east coordinates may be determined by use of conventional surveying equipment. If a cable system is required for the dredge operation, it may also be used for a basis of location.

7. PAYMENT

- 7.01 Payment for this item shall be made on a lump sum basis and shall include all dredging, pipeline installation and maintenance, labor, equipment, quality control and all other associated costs needed to complete the work under this section.
- 7.02 Partial payments on this item will be made as a percentage of project completion; however, the final quantity of sediment placed within the dewatering basins shall not be less than the total estimated quantity shown for this project. The Division A Dredging Contractor shall be required to take initial and final cross sections of the dewatering basins in order to demonstrate that this is met. The submission of cross section information may also be used to justify partial payments. Due to possible dredging inefficiencies, hydraulic pump run time will not be the sole factor used in determining the volume of sediment removed in a given time.

SECTION 3

ACCESS AND STAGING

1. ACCESS

The Contractor shall be aware of the limited access provided to the existing tributary areas and shall be responsible for providing his own staging areas and for providing adequate and safe access roads and stream crossings.

Any improvements necessary for access across channels may be subject to the Indiana Department of Natural Resources approval. The Contractor shall be responsible to obtain such additional permits and approvals.

Construction operations for access road construction shall be carried out in such a manner and sequence that erosion and air and water pollution will be minimized and held within acceptable limits. Construction methods that enhance fish and wildlife will be used where practical. Trees, stumps, and brush removed from the construction area may be piled for wildlife habitat when approved by the Owner.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

Special attention shall be given to protecting and maintaining key shade, food, den trees, and visual resources. Removal of any trees and brush shall be done in such a manner as to avoid damage to other trees and property.

All trees, stumps, brush, and similar materials are to be removed from the site or disposed of in such a way as to have the least detrimental effect on the environment.

To the extent needed, all suitable materials removed from the excavation areas of the access road shall be used on the construction of the earthfill areas of the access road. All surplus or unsuitable materials shall be disposed of in a manner that will not interfere with the functioning of the road.

Material placed in the fill areas of access roads shall be free of detrimental amounts of sod, roots, frozen soil, stones over six inches in diameter or other objectionable material. The distribution and gradation of materials shall be such that there will be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material.

Topsoil shall be removed and stockpiled on areas where establishment of vegetation is a problem on exposed subsoils (all subsoils except loam, silt loam, and sandy loam, except where dense till is present). Topsoil shall be respread to provide a seedbed.

Where subsoil is exposed or is used in construction, a minimum of 4 inches of topsoil will be placed.

2. STAGING AREA

The Contractor shall locate all equipment, trailers, materials, etc. as near to the excavation sites as possible to minimize traffic conflicts. The Contractor shall also be responsible for providing all temporary power and phone service required.

SECTION 4

PAVEMENT CROSSINGS

1. GENERAL

1.01 Scope

The Contractor shall make himself fully aware with the access to the sediment placement and dewatering sites from each tributary bay/channel area. The Contractor shall be responsible to coordinate with the County Highway Department and private land owners and identify loading limits and safety requirements of the various roadways. All permits and bonds required by the County shall be the responsibility of the Contractor.

The Contractor shall be responsible for any damage to drives, roads, culverts, etc. caused by dredge equipment and material pumping and/or hauling. Any repairs made due to damage caused by the Contractor shall be at his expense. The Contractor shall also keep all roads clean from all mud and other materials at all times, particularly by the end of each day.

The Contractor shall furnish all materials, labor, equipment and do all work necessary to complete the restoration and replacement of permanent pavement for streets, roads, alleys, driveways, etc. that are disturbed and/or specified.

3. PRODUCT

3.01 Pavement Materials

A. Asphalt Pavement Replacement

1. Hot asphalt concrete base materials Class B, or better, shall be in accordance with these specifications and Section 403 of the Indiana Department of Transportation Standard Specifications 1995 (ie. latest edition) INDOTSS. A tack coat per Section 902 shall be applied before placing the surface course.
2. Asphalt surface shall be Class B, or better, Hot Asphaltic Concrete Surface per Section 403, INDOTSS, latest edition.

B. Compacted Aggregate Base

Compacted crushed stone shall be compacted aggregate base meeting the requirements of Section 303 of INDOTSS, latest edition. Aggregate shall meet the requirements for No. 53 coarse aggregate in Article 904.02 of INDOTSS, latest edition.

3.02 Pipe Materials

All pipe crossings shall consist of no less than 12 inches in diameter pipe for the following acceptable products in accordance with the INDOTSS:

- a. Aluminized Type 2 Steel, Corrugated Pipe, 0.064 inch thickness
- b. Reinforced Concrete Pipe, Class 3 per ASTM C76
- c. Welded Steel Casing Pipe, 0.25 inch wall thickness

3. EXECUTION

3.01 Installation

The placement of all pavement materials shall be in accordance with these specifications and the Indiana Department of Transportation Standard Specifications 1995 (ie. latest edition) INDOTSS. All road cuts shall be saw cut prior to removal of the pavement.

A. Asphalt Pavement Replacement

All asphalt road repairs shall consist of no less than a 1 inch Hot Asphaltic Concrete surface mix No. 11 or 12 on 4 inches of HAC base (binder) mix No. 9. in accordance with the INDOTSS, latest edition when existing asphalt pavements are disturbed.

B. Compacted Aggregate Surfaces and Base

All road repairs shall consist of providing no less than 8 inches of compacted aggregate, #53 compacted crushed stone. During construction, all pavement crossings shall be filled with compacted surfaces and bases and maintained to minimize the development of objectionable pavement depressions.

3.02 Pipe Crossings

All pipe crossings shall be backfilled with granular backfill or compacted aggregate as soon as the pipe is placed so as to minimize disturbance to traffic.

3.03 Traffic Control

The Contractor shall plan construction activities to minimize impact to traffic. Local traffic access must be maintained at all times. To maintain traffic movement, appropriate traffic control devices shall be used. Such traffic control devices shall comply with the latest edition of the Indiana Manual on Uniform Traffic Control Devices. The Contractor shall follow the requirements of the INDOT Traffic Control Plan included herein at the end of this section when no other plan is submitted for review.

4. PAYMENT

4.01 Pavement Materials

No separate payment will be made for this item, but the cost for this work shall be included in the cost for Section 3, Dredging.

4.02 Pipe Materials

No separate payment will be made for this item, but the cost for this work shall be included in the cost for Section 3, Dredging.

SECTION 5

STEEL SHEET PILING

1. GENERAL

1.01 Scope

The Contractor for the Division A, Dredging Contract, shall furnish and install steel sheet piling as necessary to complete the work shown and/or as specified.

2. PRODUCT

2.01 Steel Sheet Piling

- A. All steel sheet piling provided and installed for this project shall be no less than Contech Metric Sheeting using aluminized steel, Type 2 or approved equal. It shall be at least 0.1046" thick (12 gage) and have a weight of at least 6.0 lbs./sq. ft.
- B. Steel sheet piling shall be in accordance with ASTM A463, T2, 100 and ASTM A428. No splicing will be allowed. All connections shall be fabricated with angles or bent plates with appropriate grades as necessary and with high-strength bolts. Connections shall be furnished with angles or plates made from similar steel and with ASTM A325 type 3 bolts.

3. EXECUTION

3.01 Installation

The storage, handling and installation of steel sheet piling shall conform with Section 711 - Steel Structures, of the Indiana Department of Transportation Standard Specifications 1995 (ie. latest edition) INDOTSS. All piling shall be installed plumb within tolerances as specified in the INDOTSS.

4. PAYMENT

4.01 Steel Sheet Piling

Payment for steel sheet piling shall be made on a lump sum basis. Payment under this item shall also include all installation costs including any necessary welding, cutting or other ancillary costs to complete the installation.

SECTION 6

RIPRAP AND SHOT ROCK

1. GENERAL

1.01 Scope

- A. The Contractor shall furnish and install 12-inch riprap and shot rock when needed to control erosion or as specified herein.

2. PRODUCT

2.01 Riprap

All riprap provided for this project shall be provided in accordance with Section 616, "Riprap and Slopewall" of the Indiana Department of Transportation Standard Specification, 1995 (i.e., latest edition)(INDOTSS) for 12-inch riprap except for hauling, measurement, and payment methods. This is to establish material size and type, not the method of placement.

2.02 Geotextile - N/A

2.03 Shot Rock

Shot rock when provided for this project shall be sized such that 50 percent is no less than 250 pounds per piece and is Class B or better material in accordance with Section 904 of the INDOTSS.

3. EXECUTION

3.01 Installation

- A. Riprap shall be installed in accordance with Section 616 of the INDOTSS under the section for "dumped riprap" except that the material is to be placed under a submerged condition.
- B. Shot rock shall be embedded no less than one (1) foot and be leveled as much as possible to the lines indicated in the plans.

4. PAYMENT

4.01 Geotextile - N/A

4.02 Riprap

Payment for hand laid installed shall be made on a lump sum basis under this item. Payment under this item shall also include all installation costs including labor and other ancillary costs to complete the installation.

4.03 Shot Rock

Payment for shot rock installed shall be made on a lump sum basis under this item. Payment under this item shall also include all installation costs including excavation, labor and other ancillary costs to complete the installation.

5. ALTERNATE ITEM

5.01 Woven zinc cortex — double twist 6 x 8 type wire mesh revetment mattresses with filled diaphragm Maccaferri Inc. Or approved equal or polyethylene "Triton Mattress" by Contech or approved equal may be used in lieu of 12 inch hand laid riprap or shot rock due to its ability to utilize and contain smaller aggregates. Only hard, durable stone shall be used as fill.

5.02 Mattresses shall be no less than 9 inches thick capable of being completed on land or structure and being lifted and set into place.

5.03 Life expectancy of mattress materials shall be no less than 50 years.

6. PAYMENT

6.01 Riprap and Shot Rock Materials

For Division A, Dredging Contract, payment for this item shall be made on a lump sum basis and shall include all labor, equipment, materials and all other associated costs needed to complete the work under this section.

For Division B, Sediment Placement Site Contract, no separate payment will be made for this item, but the cost for this work shall be included in the cost for Section 2, Sediment Placement Site Earthwork.

SECTION 7

SEEDING AND SODDING

1. **SOIL STABILIZATION AND VEGETATION RE-ESTABLISHMENT OF EXCAVATED AREAS** (to override the section WM - 31 Seeding and Sodding Specification)

1.01 **Re-establishment of Permanent Vegetative Cover**

- A. Upon finish grading of work area the CONTRACTOR shall permanently seed and stabilize all final grade areas above the water line.
- B. CONTRACTOR shall attempt to seed during optimal seeding dates. During the growing season optimal dates are March 1 - May 10 and August 10 - September 30. Optimal seeding dates during dormant period (temperatures below 50°) are December 1 through March 28. Seedbed preparation erosion control blankets and mulch can be applied months ahead of actual seeding. Seed can then be applied directly to the prepared seedbeds.
- C. The following combinations of seed will be permissible for their respective applications.

**Permanent Seeding Areas For Finish Grade
Completed Between March 1 and September 30**

Steep Banks and Low Maintenance Areas Not in Channels or Ditches		
Seed Species and Mixture Options	Rates Per Acre	Optimum Soil pH
Smooth brome grass + red clover	30 lbs. 15 lbs.	5.5 - 7.5
Tall fescue + white or ladino clover	45 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + red clover	45 lbs. 15 lbs.	5.5 - 7.5
Lawns and High Maintenance Areas		
Seed Species and Mixture Options	Rates Per Acre	Optimum Soil pH
Bluegrass	130 lbs.	5.5 - 7.0
Perennial ryegrass (turf type) + bluegrass	55 lbs. 80 lbs.	5.6 - 7.0
Tall fescue (turf type) + bluegrass	150 lbs. 25 lbs.	5.6 - 7.5

Channels and Areas of Concentrated Flow		
Seed Species and Mixture Options	Rates Per Acre	Optimum Soil pH
Perennial ryegrass + white or ladino clover*	125 lbs. 2 lbs.	5.6 - 7.0
Kentucky bluegrass + smooth bromegrass + switchgrass + timothy + perennial ryegrass + white or ladino clover*	20 lbs. 10 lbs. 3 lbs. 4 lbs. 10 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + white or ladino clover*	125 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + perennial ryegrass + Kentucky bluegrass	120 lbs. 20 lbs. 20 lbs.	5.5 - 7.5

**Permanent Seeding Areas For Finish Grade
Completed Between September 30 and February 28**

Steep Banks and Low Maintenance Areas		
Seed Species and Mixture Options	Rate per Acre	Optimum Soil pH
Smooth bromegrass + red clover*	45 lbs. 20 lbs.	5.5 - 7.5
Tall fescue + white or ladino clover*	60 lbs. 3 lbs.	5.5 - 7.5
Tall fescue + red clover*	65 lbs. 20 lbs.	5.5 - 7.5
Lawns and High Maintenance Areas		
Bluegrass	185 lbs.	5.5 - 7.0
Perennial ryegrass (turf type) + bluegrass	80 lbs. 120 lbs.	5.6 - 7.0
Tall fescue (turf type) + bluegrass	225 lbs. 35 lbs.	5.6 - 7.5

Channels and Areas of Concentrated Flow		
Perennial ryegrass + white or ladino clover*	190 lbs. 2 lbs.	5.6 - 7.0
Kentucky bluegrass + smooth bromegrass + switchgrass + timothy + perennial ryegrass + white or ladino clover*	30 lbs. 15 lbs. 5 lbs. 6 lbs. 15 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + white or ladino clover*	190 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + perennial bluegrass + Kentucky bluegrass	190 lbs. 26 lbs. 26 lbs.	5.5 - 7.5

For best results: (a) legume seed should be inoculated; (b) seeding mixtures containing legumes should preferably be spring seeded, although the grass may be fall seeded and the legume frost seeded; (c) and if legumes are fall seeded do so in early fall.

1.02 Mulch and Over Seeded Areas

A. See Workmanship and Materials Specifications WM 31.

2. ADDITIONAL SEEDING MIXTURE REQUIREMENTS

2.01 Prairie Grass Mixtures

In addition to the above required seed mixtures, an additional prairie grass mixture shall be required over the sediment placement site. This mixture shall be Seed Mixture D in accordance with the Indiana Department of Transportation Standard Specifications, 1995 (or latest) edition and shall consist of 15 lbs of the following mix design:

	<u>Type</u>	<u>Amount</u>
a.	Fowl Mana Grass	1 oz
b.	Carex	2 oz
c.	Rice Cut Grass	2 oz
d.	Bullrush	2 oz
e.	Leptochloa	2 oz
f.	Barnyard Grass	2 0z
g.	Prairie Wild Rye	2 lb
h.	Perennial Ryegrass	10 lb
i.	Jasper Red Fescue	2 lb
j.	"Fults" Puccinella Distans	2 oz
k.	Redtop	1 lb

3. PAYMENT

3.01 Payment

All costs for work covered under this section shall not be paid for separately but shall be included in Section 2, Sediment Placement Site Earthwork.

PART 9

PROPOSAL DOCUMENTS

PART 9

BID PROPOSAL DOCUMENTS

DIVISION "A" - LAKE DREDGING CONTRACT

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BID OF

(Contractor)

(Address)

**FOR
PUBLIC WORKS PROJECTS
OF
SHAPER-FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORPORATION
DIVISION "A"
LAKE DREDGING CONTRACT**

Filed _____, 19____

Action taken _____

CONTRACTORS BID FOR PUBLIC WORKS

PART I

(To be completed for all bids)
(Please type or print)

- Date: _____
1. Governmental Unit: Shafer-Freeman Lakes Env. Conservation Corp.
2. County: White
3. Bidder (Firm): _____
- Address: _____
- City/State: _____
4. Telephone Number: _____
5. Agent of Bidder (If applicable): _____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of SELECC (Governmental Unit) in accordance with plans and specifications of said unit for the sum of _____ \$. The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, submit a proposal for each in accordance with the notice.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract. If the bid is to be awarded on a unit basis, the itemization of units shall be shown on a separate attachment. The Contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(If applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States. I.C. 5-16-8-2. I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

NON-COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to induce anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee, gift, commission or thing of value on account of such sale.

OATH AND AFFIRMATION

I affirm under the penalties of perjury that the foregoing facts and information are true and correct to the best of my knowledge and belief.

Dated at _____ this _____ day of _____, 19____

(Name of Organization)

By _____

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) SS:
COUNTY OF _____)

_____ being duly sworn, deposes and says that he is
(Title) of the above _____ (Name of Organization) and that the
statements contained in the foregoing bid, certification and affidavit are true and correct.

Subscribed and sworn to before me this _____ day of _____, 19____

Notary Public

My Commission Expires: _____

County of Residence: _____

ACCEPTANCE

The above bid is accepted this _____ day of _____, 19____, subject to the following conditions: _____

Contracting Authority Members:

PART II

(Complete sections I, II, III and IV for all state and local public works projects as required by statutes.)

Governmental Unit: Shafer-Freeman Lakes Environmental Conservation Corp.

Bidder (Firm): _____

Date: _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed?

Contract Amount	Class of Work	When Completed	Name and Address of Owner

2. What public works projects has your organization now in process of construction?

Contract Amount	Class of Work	When to be Completed	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

4. List references from private firms for which you have performed work.

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work.
2. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you expect to require a bond.
3. What equipment do you intend to use for the proposed project?
4. Have you made contracts or received offers for all materials within prices used in preparing your proposal?

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

See Attached Financial Statement

SECTION IV OATH AND AFFIRMATION

I hereby affirm under the penalties of perjury that the facts and information contained in the foregoing bid for public works are true and correct to the best of my knowledge and belief.

Dated at _____ this _____ day of _____, 19____

(Name of Organization)

By _____

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)

) SS:

COUNTY OF _____)

_____ being duly sworn, deposes and says that he is

(Title)

_____ of the above _____ and that the
(Name of Organization)

answers to the questions in the foregoing questionnaires and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 19____

Notary Public

My Commission Expires: _____

County of Residence: _____

BID PRICE

The Contractor agrees to perform all the work described in the Contract Documents for a lump sum total price and for the bid prices identified on the attached Itemized Bid Schedules. Payment to the Contractor will be calculated based on these unit and/or lump sum prices for partial payments, not to exceed the lump sum price bid. The total bid price shall be the sum of the total bid price for Divisions "A" and "B" minus any deducts as evidenced by separate letter with the bid.

TIME OF COMPLETION AND LIQUIDATED DAMAGES

If awarded a Contract, the Contractor agrees to begin work within ten (10) calendar days of the effective date of the Notice to Proceed and further agrees to proceed with all possible dispatch to substantially complete and provide all items into operation (service) within 250 consecutive calendar days from the date of the Notice to Proceed and fully complete all work ready for final inspection, acceptance and close-out within 30 additional days from the date of the substantial completion.

If awarded a Contract, and in the case the work is not completed either substantially or fully within the above deadlines to the satisfaction of the Owner, the undersigned agrees to pay to the Owner as liquidated damages the sum of Five Hundred Dollars (\$500.00) per day for each and every successive day, Sundays and Holidays included, after the agreed upon time until the work is completed and accepted by the Owner.

The liquidated damages apply to the failure to meet either the substantially complete and/or the fully complete deadlines stated above.

ITEMS TO BE SUBMITTED WITH BID

The Contractor shall be aware that the following documents are required with his Bid:

1. Bid Guaranty (Bid Bond)
2. Indiana State Form No. 96 (Revised, 1987) with Non-Collusion Affidavit
3. Financial Statement for Bidders
4. Bid Schedules
5. Letter w/Deduct when bidding both Divisions "A" and "B"

ADDENDA

The Bidder hereby acknowledges receipt of the following addenda: _____

ITEMIZED BID SCHEDULE "A"
LAKE SHAFER LAKE ENHANCEMENT DESIGN PROJECT
AREA 1 - HONEY CREEK
DIVISION A: LAKE DREDGING CONTRACT

<u>Item No.</u>	<u>Description</u>	<u>Qty.</u>	<u>Units</u>	<u>Unit Price (in words)</u>	<u>Unit Price</u>	<u>Total Price</u>
1	Mobilization, Bond, and Other	1	L.S.	_____	\$ _____	\$ _____
2	Dredging	1	L.S.	_____	\$ _____	\$ _____
5	Furnish and Install, Complete 0.1045" Steel Type 2, Sheet Piling	1	L.S.	_____	\$ _____	\$ _____
6	Riprap and Shot Rock	1	L.S.	_____	\$ _____	\$ _____

TOTAL LUMP SUM BID OF **DIVISION A** ALL ITEMS (1, 2, 5 and 6) \$ _____ *

(in figures)

TOTAL LUMP SUM BID OF **DIVISION A** ALL ITEMS (1, 2, 5 and 6) _____ *

(in words)

* The total base bid amount shown here must agree with the amount shown on Form 96, page P-2.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____
_____ as Principal, and _____
_____ as Surety, are hereby held and firmly bound unto the Shafer-Freeman Lakes
Environmental Conservation Corporation (SFLECC) as OWNER in the penal sum of _____
_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind
ourselves, successors and assigns.

Signed, this _____ day of _____, 19_____.

The Condition of the above obligation is such that whereas the Principal has submitted to _____
_____ a certain BID, attached hereto and hereby made a part hereof
to enter into a contract in writing, for the _____

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract
in the Form of Contract attachment hereto (properly completed in accordance with said BID) and
shall furnish a BOND for faithful performance of said contract, and for the payment of all persons
performing labor furnishing materials in connection therewith, and shall in all other respects perform
the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise
the same shall remain in force and effect; it being expressly understood and agreed that the liability
of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this
obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and
its BOND shall be in no way impaired or affected by any extension of the time within which the
OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

Surety

By: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

Financial Statement for Bidders

Submitted to.....

By..... { A Corporation
 { A Co-partnership
 { An Individual

Address

Date submitted..... 19.....

Contractor's Financial Statement

Submitted by..... { ☐ A Corporation
☐ A Co-partnership
☐ An Individual
with principal office at.....
To.....

Condition at close of business.....

19.....

	Dollars				Cts.
ASSETS					
1. Cash: (a) On hand \$....., (b) In bank \$....., (c) Elsewhere \$.....					
2. Notes receivable (a) Due within 90 days.....					
(b) Due after 90 days.....					
(c) Past due.....					
3. Accounts receivable from completed contracts, exclusive of claims not approved for payment.....					
4. Sums earned on uncompleted contracts as shown by engineer's or architect's estimate.....					
(a) Amount receivable after deducting retainage.....					
(b) Retainage to date, due upon completion of contracts.....					
5. Accounts receivable from sources other than construction contracts.....					
6. Deposits for bids or other guarantees: (a) Recoverable within 90 days.....					
(b) Recoverable after 90 days.....					
7. Interest accrued on loans, securities, etc.....					
8. Real estate: (a) Used for business purposes.....					
(b) Not used for business purposes.....					
9. Stocks and bonds: (a) Listed—present market value.....					
(b) Unlisted—present value.....					
10. Materials in stock not included in Item 4 (a) For uncompleted contracts (present value).....					
(b) Other materials (present value).....					
11. Equipment, book value.....					
12. Furniture and fixtures, book value.....					
13. Other assets.....					
Total assets.....					
LIABILITIES					
1. Notes payable: (a) To banks regular.....					
(b) To banks for certified checks.....					
(c) To others for equipment obligations.....					
(d) To others exclusive of equipment obligations.....					
2. Accounts payable: (a) Not past due.....					
(b) Past due.....					
3. Real estate encumbrances.....					
4. Other liabilities.....					
5. Reserves.....					
6. Capital stock paid up: (a) Common.....					
(b) Common.....					
(c) Preferred.....					
(d) Preferred.....					
7. Surplus (net worth).....					
Total liabilities.....					
CONTINGENT LIABILITIES					
1. Liability on notes receivable, discounted or sold.....					
2. Liability on accounts receivable, pledged, assigned or sold.....					
3. Liability as bondsman.....					
4. Liability as guarantor on contracts or on accounts of others.....					
5. Other contingent liabilities.....					
Total contingent liabilities.....					

DETAILS RELATIVE TO ASSETS

1 Cash (a) on hand..... \$.....
 (b) deposited in banks named below.....
 (c) elsewhere—(state where).....

NAME OF BANK	LOCATION	DEPOSIT IN NAME OF	AMOUNT
.....
.....
.....
.....

2* Notes receivable (a) due within 90 days..... \$.....
 (b) due after 90 days.....
 (c) past due.....

RECEIVABLE FROM: NAME AND ADDRESS	FOR WHAT	DATE OF MATURITY	HOW SECURED	AMOUNT
.....
.....
.....
.....
.....

Have any of the above been discounted or sold?..... If so, state amount, to whom, and reason.....

3* Accounts receivable from completed contracts exclusive of claims not approved for payment..... \$.....

NAME AND ADDRESS OF OWNER	NATURE OF CONTRACT	AMOUNT OF CONTRACT	AMOUNT RECEIVABLE
.....
.....
.....
.....
.....

Have any of the above been assigned, sold, or pledged?..... If so, state amount, to whom, and reason.....

4* Sums earned on uncompleted contracts, as shown by engineer's or architect's estimate:
 (a) Amount receivable after deducting retainage..... \$.....
 (b) Retainage to date due upon completion of contract.....

DESIGNATION OF CONTRACT AND NAME AND ADDRESS OF OWNER	AMOUNT OF CONTRACT	AMOUNT EARNED	AMOUNT RECEIVED	RETAINAGE		AMOUNT EXCLUSIVE OF RETAINAGE
				WHEN DUE	AMOUNT	
.....
.....
.....
.....
.....
.....

Have any of the above been sold, assigned, or pledged?..... If so, state amount, to whom, and reason.....

* List separately each item amounting to 10 per cent or more of the total and combine the remainder.

DETAILS RELATIVE TO ASSETS (Continued)

5 Accounts receivable not from construction contracts..... \$

RECEIVABLE FROM: NAME AND ADDRESS	FOR WHAT	WHEN DUE	AMOUNT
.....
.....
.....
.....
.....
.....
.....
.....
.....

What amount, if any, is past due..... \$

6 Deposits with bids or otherwise as guarantees..... \$

DEPOSITED WITH: NAME AND ADDRESS	FOR WHAT	WHEN RECOVERABLE	AMOUNT
.....
.....
.....
.....
.....
.....
.....
.....
.....

7 Interest accrued on loans, securities, etc..... \$

ON WHAT ACCRUED	TO BE PAID WHEN	AMOUNT
.....
.....
.....
.....
.....
.....
.....
.....
.....

8 Real estate { (a) Used for business purposes..... \$
book value { (b) Not used for business purposes.....

DESCRIPTION OF PROPERTY	IMPROVEMENTS		TOTAL BOOK VALUE
	NATURE OF IMPROVEMENTS	BOOK VALUE	
1
2
3
4
5
6
7

LOCATION	HELD IN WHOSE NAME	ASSESSED VALUE	AMOUNT OF ENCUMBRANCES
1
2
3
4
5
6
7

* List separately each item amounting to 10 per cent or more of the total and combine the remainder.

9 Stocks and bonds: (a) Listed—present market value..... \$.....
(b) Unlisted—present value.....

DESCRIPTION		ISSUING COMPANY	LAST INT. OR DIV. PAID		PAR VALUE	PRESENT MARKET VALUE	QUANTITY	AMOUNT
			DATE	%				
1								
2								
3								
4								
5								
6								
7								

WHO HAS POSSESSION		IF ANY ARE PLEDGED OR IN ESCROW, STATE FOR WHOM AND REASON	AMOUNT PLEDGED OR IN ESCROW
1			
2			
3			
4			
5			
6			
7			

10	Materials in stock and not included in Item 4, Assets:	
	(a) For use on uncompleted contracts (present value).....	\$.....
	(b) Other materials (present value).....	\$.....

[illegible]

11* Equipment at book value.....\$

[illegible]

Are there any liens against the above?..... If so, state total amount..... \$

* If two or more items are lumped above, give the sum of their ages.

DETAILS RELATIVE TO ASSETS (Continued)

12 Furniture and fixtures at book value..... \$.....

13 Other assets..... \$.....

DESCRIPTION	AMOUNT

TOTAL ASSETS :

DETAILS RELATIVE TO LIABILITIES

1 Notes payable { (a) To banks, regular..... \$.....
 (b) To banks for certified checks.....
 (c) To others for equipment obligations.....
 (d) To others exclusive of equipment obligations.....

TO WHOM: NAME AND ADDRESS	WHAT SECURITY	WHEN DUE	AMOUNT

2 Accounts payable { (a) Not past due..... \$.....
 (b) Past due.....

TO WHOM: NAME AND ADDRESS	FOR WHAT	DATE PAYABLE	AMOUNT

3 Real estate encumbrances (See Item 8, Assets)..... \$.....

4 Other liabilities..... \$.....

DESCRIPTION	AMOUNT

5 Reserves..... \$.....

INTEREST	INSURANCE	BLDGS. & FIXT.	PLANT DEPR.	TAXES	BAD DEBTS		
\$.....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....

6 Capital stock paid up { (a) Common..... \$.....
 (b) Preferred.....

7 Surplus..... \$.....

TOTAL LIABILITIES :

If a corporation answer this:

Amount for which incorporated.....

Capital paid in cash..... \$.....

When incorporated.....

In what state.....

Names and titles of all persons having authority to execute and receipt estimate vouchers and to conduct other business for the corporation, including its officers, the signatures of whom are legally binding.

.....

.....

.....

.....

.....

Do you have necessary "certificate of authority" to transact corporate business in this state, under the terms of Chapter 215, Acts of 1929, and acts amendatory thereto?.....

If a co-partnership answer this:

Date of organization.....

State whether co-partnership is general, limited or association.....

Give the names, addresses and proportional interests of all parties:

Name	Address	Share
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....

The name of the partnership firm under which the above partners are operating is.....

Give names and titles of all persons having authority to execute and receipt estimate vouchers and to conduct other business for the partnership, the signatures of whom are legally binding.

The undersigned hereby declares that the foregoing is a true statement of the financial condition of the individual, co-partnership or corporation herein first named, as of the date herein first given; that this statement is for the express purpose of inducing the party to whom it is submitted to award the submitter a contract; and that any depository, vendor or other agency herein named is hereby authorized to supply such party with any information necessary to verify this statement.

NOTE: A co-partnership must give firm name and signatures of all partners.
A corporation must give full corporate name, signature of official and affix corporate seal.

Affidavit for Individual

STATE OF _____ }
COUNTY OF _____ } ss:

_____ being duly sworn, deposes and says that the foregoing financial statement, taken from his books, is a true and accurate statement of his financial condition as of the date thereof and that the answers to the foregoing interrogatories are true.

Subscribed and sworn to before me this

_____ day of _____ 19____

(Applicant must sign here)

Notary Public

Affidavit for Co-Partnership

STATE OF _____ }
COUNTY OF _____ } ss:

_____ being duly sworn, deposes and says that he is a member of the firm of _____; that he is familiar with the books of the said firm showing its financial condition; that the foregoing financial statement, taken from the books of the said firm, is a true and accurate statement of the financial condition of the said firm as of the date thereof and that the answers to the foregoing interrogatories are true.

Subscribed and sworn to before me this

_____ day of _____ 19____

(Member of firm must sign here)

Notary Public

Affidavit for Corporation

STATE OF _____ }
COUNTY OF _____ } ss:

_____ being duly sworn, deposes and says that he is _____ of the _____, the corporation described in and which executed the foregoing statement; that he is familiar with the books of the said corporation showing its financial condition; that the foregoing financial statement, taken from the books of the said corporation, is a true and accurate statement of the financial condition of said corporation as of the date thereof and that the answers to the foregoing interrogatories are true.

Subscribed and sworn to before me this

_____ day of _____ 19____

(Officer must sign here)

Notary Public

PART 10

CONTRACT DOCUMENTS

PART 10

CONTRACT DOCUMENTS

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AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 19____,
by and between Shafer-Freeman Lakes Environmental Conservation Corporation (SFLECC),
hereinafter called "OWNER" and _____ doing business
as (an individual), or (a partnership), or (a corporation) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter
mentioned:

1. The CONTRACTOR will commence and complete the construction of _____
_____.
2. The CONTRACTOR will furnish all materials, supplies, tools, equipment, labor, and
other services necessary for the construction and completion of the PROJECT
described herein.
3. The CONTRACTOR will commence the work required by the CONTRACT
DOCUMENTS within _____ calendar days after the date of the NOTICE TO
PROCEED and will complete the same within _____ calendar days unless the
period for completion is extended otherwise by the CONTRACT DOCUMENTS.
4. The CONTRACTOR agrees to perform all of the work described in the CONTRACT
DOCUMENTS and comply with the terms therein for the sum of \$ _____ or
as shown in the BID schedule.
5. The term "CONTRACT DOCUMENTS" means and includes the following:
 - (A) Advertisement for BIDS
 - (B) Information for BIDDERS
 - (C) BID
 - (D) BID BOND
 - (E) Non-Collusion Affidavit
 - (F) Compliance Statement (Not Applicable)
 - (G) NOTICE OF AWARD

- (H) Agreement
- (I) Performance BOND
- (J) Payment BOND
- (K) Non-Discrimination Clause (Not Applicable)
- (L) NOTICE TO PROCEED
- (M) CHANGE ORDER
- (N) Certificate of Substantial Completion
- (O) General Conditions
- (P) SUPPLEMENTAL GENERAL CONDITIONS (Not Applicable)
- (Q) DRAWINGS prepared by COMMONWEALTH ENGINEERS, INC.
 Numbered _____ through _____, and dated _____,
 Numbered _____ through _____, and dated _____,
 Numbered _____ through _____, and dated _____,
- (R) SPECIFICATIONS prepared or issued by COMMONWEALTH ENGINEERS, INC.
 Dated _____, 19____, Dated _____, 19____
- (S) ADDENDA:
 No. _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____

- 6. The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.
- 7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in _____ (Number of Copies) each of which shall be deemed an original on the date first above written.

OWNER: **SFLECC**

By: _____

Name: _____
(Please Type)

Title: _____

(SEAL)

ATTEST:

Name: _____
(Please Type)

Title: _____

By: _____

Name: _____
(Please Type)

Title: _____

(SEAL)

ATTEST:

Name: _____
(Please Type)

Title: _____

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting
legal representative of _____, do hereby certify as follows:

I have examined the attached contract(s) and performance and payment bond(s) and contractor's Certificate of Insurance and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements are adequate, and have been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

Date: _____

NOTE: Delete phrase "performance and payment bonds" when not applicable.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

_____ Dollars, \$(_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 19____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiary hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of
(Number)
one of which shall be deemed an original, this the ____ day of _____, 19__.

ATTEST:

(SEAL)

(Witness as to Principal)

(Address)

Principal
BY _____ (s)

(Address)

Surety

ATTEST:

(Surety) Secretary

(SEAL)

(Witness as to Surety)

(Address)

BY _____
Attorney-in-Fact

(Address)

NOTE: Date of BOND must not be prior to date of Contract.
If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called PRINCIPAL, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called SURETY are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____
_____, Dollars, \$(_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the _____ day of _____, 19____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL, shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, is being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiary hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of
(Number)
one of which shall be deemed an original, this the ____ day of _____ 19__.

ATTEST:

Principal
BY _____ (s)

(SEAL)

(Witness as to Principal)

(Address)

(Address)

Surety

ATTEST:

(Surety) Secretary

(SEAL)

(Witness as to Surety)

(Address)

BY _____
Attorney-in-Fact

(Address)

NOTE: Date of BOND must not be prior to date of Contract.
 If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

NOTICE OF AWARD

TO: _____

PROJECT Description: _____

_____ The OWNER has considered the BID submitted by you for the above WORK in response to its Advertisement for Bids dated _____, 19____, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 19____.

_____ SFLECC

(OWNER)

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged.

By: _____
this the _____ day of _____, 19____.
Title: _____

NOTICE TO PROCEED

TO: _____

DATE: _____
PROJ: _____

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 19__, on or before _____, 19__, and you are to complete the WORK within _____ consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 19__.

SFLECC

(OWNER)

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED
is hereby acknowledged by:

this the _____ day of _____, 19__

By: _____

Title: _____

CONTRACT CHANGE ORDER		Order No.:
		Date:
		State: Indiana
Contract For:		County: White
Owner: Shafer-Freeman Lakes Environmental Conservation Corporation		
To:		
<small>(CONTRACTOR)</small> You are hereby requested to comply with the following changes from the contract plans and specifications:		
Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
TOTALS		
NET CHANGE IN CONTRACT PRICE		
JUSTIFICATION:		
<p>The amount of the Contract will be (Decreased) (Increased) By the Sum of:</p> <p style="text-align: right;">Dollars (\$ _____).</p> <p>The Contract Total Including this and previous Change Orders Will Be:</p> <p style="text-align: right;">Dollars (\$ _____).</p> <p>The Contract Period Provided for Completion Will Be (Increased) (Decreased) (Unchanged): _____ Days.</p> <p>This document will become a supplement to the contract and all provisions will apply hereto.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div> Requested _____ (Owner) </div> <div> _____ (Date) </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> Recommended _____ (Owner's Architect/Engineer) </div> <div> _____ (Date) </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> Accepted _____ (Contractor) </div> <div> _____ (Date) </div> </div>		

ESCROW AGREEMENT

THIS ESCROW AGREEMENT made and entered into this ____ day of _____, 1997 by and between _____ hereinafter called the Escrow Agent, Shafer - Freeman Lakes Environmental Conservation Corporation, White County, Indiana hereinafter called the Owner, and _____ hereinafter called the Contractor.

WHEREAS, the Owner and the Contractor entered into a contract dated _____, providing for the construction by the Contractor of the _____ Project, for the Shafer - Freeman Lakes Environmental Conservation Corporation subject to the provisions of IC 36-1-12-14, and

WHEREAS, said construction contract provides that portions of payments by the Owner to the Contractor shall be retained by the Owner (herein called Retainage), and

WHEREAS, all retainage shall be deposited in an Escrow Account.

NOW, THEREFORE, it is agreed as follows:

1. The Owner will hereafter deliver or cause to be delivered to the Escrow Agent that portion of the Retainage to be placed in escrow, to be held in escrow in accordance with the terms of this Agreement.
2. The Escrow Agent will promptly invest this Retainage in such obligations as selected by the Escrow Agent at its discretion. All income earned on such funds shall be added to and become a part of the escrowed principal.
3. The Escrow Agent shall pay over the net sum held by it hereunder as follows:
 - a. In the manner directed by the joint written authorization of the Owner and Contractor.
 - b. In the absence of such a joint written authorization, upon receipt from the Owner of a written notice pursuant to Article 18 of the General Conditions showing that the Owner has terminated the employment of the Contractor, then the Escrow Agent shall pay over to the Owner the net sum held by it hereunder.
 - c. In the absence of such a joint written authorization and in the absence of the termination of the employment of the Contractor as provided in b., above, in the manner directed by a certified copy of a judgment of a court of record establishing the rights of the parties to said funds.
4. This Escrow Agreement shall constitute the direction from the Owner and Contractor to the Escrow Agent of the manner in which the Retainage is to be paid by the Escrow Agent, pursuant to IC 36-1-12-14.
5. The Escrow Agent shall deduct, before any payment from the amounts received hereunder, its fee as Escrow Agent, which fee shall be payable from the income earned by the retainage and which escrow fee shall in no event exceed fifty percent (50%) of said income earned.
6. This Agreement and anything done or performed hereunder by either the Contractor or Owner shall not be constructed to prejudice or limit the claims which either party may have

against the other arising out of the aforementioned construction agreement.

7. This instrument constitutes the entire Agreement between the parties regarding duties of the Escrow Agent with respect to the investment and payment of escrow funds; the Escrow Agent is not liable to the Owner and Contractor for any loss or damages other than by its own negligence or willful misconduct.

OWNER
SHAHER - FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORPORATION

By: _____

(Contractor)

By: _____

(Escrow Agent)

By: _____

CERTIFICATE OF SUBSTANTIAL COMPLETION

OWNER's Project No.

ENGINEER's Project No.

Project

CONTRACTOR

Contract For

Contract Date

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To
OWNER

And To
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

.....
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

EJCDC No. 1910-8-D (1983 Edition)

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: _____

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____, 19 _____

ENGINEER

By _____

CONTRACTOR accepts this Certificate of Substantial Completion on _____, 19 _____

CONTRACTOR

By _____

OWNER accepts this Certificate of Substantial Completion on _____, 19 _____

OWNER

By _____

ATTACHMENT TO CERTIFICATE OF SUBSTANTIAL COMPLETION

PUNCH LIST
FOR

.....
(Contract)

.....
(Date)

Item

Value of
Uncompleted
Work

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR THE

LAKE SHAFER - LAKE ENHANCEMENT PROJECT

AREA 1: HONEY CREEK

Division B: Sediment Placement Site Contract

FOR THE

**SHAFER - FREEMAN LAKES ENVIRONMENTAL
CONSERVATION CORPORATION**

January, 1997

**COMMONWEALTH
ENGINEERS, INC.**

*Environmental Engineers and Consultants
Indianapolis, Indiana*

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR THE

LAKE SHAFER - LAKE ENHANCEMENT PROJECT

AREA 1: HONEY CREEK

Division B: Sediment Placement Site Contract

BY THE

SHAFER - FREEMAN LAKES ENVIRONMENTAL
CONSERVATION CORPORATION

January, 1997

CORPORATION OFFICIALS

Robert Coates
Don Tribbett
Barbara Kawecki
George Sheehan

President
V-President
Secretary
Treasurer

**COMMONWEALTH
ENGINEERS, INC.**

*Environmental Engineers and Consultants
Indianapolis, Indiana 46237*

CERTIFIED BY: _____

G. Edwin Tinkle II P.E.
Indiana P.E. No. 15139

DATE: _____

CONTRACT DOCUMENTS AND SPECIFICATIONS
FOR THE
LAKE SHAFER - LAKE ENHANCEMENT PROJECT
AREA 1: HONEY CREEK

Division B: Sediment Placement Site Contract

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PART 1

ADVERTISEMENT FOR BIDS

ADVERTISEMENT FOR BIDS

**SHAFER-FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORPORATION**

**LAKE SHAFER LAKE ENHANCEMENT PROJECT
AREA 1: HONEY CREEK**

**Division A: Lake Dredging Contract
Division B: Sediment Placement Site Contract**

NOTICE IS HEREBY GIVEN that the Shafer-Freeman Lakes Environmental Conservation Corporation of White County, Indiana, by and through its Board of Directors, hereinafter referred to as the OWNER, will receive sealed proposals for the construction of the LAKE SHAFER LAKE ENHANCEMENT PROJECT, AREA 1, HONEY CREEK: DIVISION A: LAKE DREDGING CONTRACT AND DIVISION B: SEDIMENT PLACEMENT SITE CONTRACT, in White County, Indiana.

Sealed proposals are invited and may be forwarded by registered mail, addressed to the Shafer-Freeman Lakes Environmental Conservation Corporation in care of Robert Coates, or delivered in person to the bid opening, and will be considered by the Owner at a public meeting called to receive and open such proposals not later than 1:00 P.M. (local time) on _____, 1997 at 218 N. Main, P.O. Box 372, Monticello, Indiana 47960. Proposals received after said time will be returned unopened.

A prebid meeting will be held at _____ A.M. (local time) on _____, 1997 at the above office. All prime contractors, subcontractors, small, minority or women business enterprises and other interested parties are invited to attend.

The Lake Shafer Lake Enhancement Project, Area 1, Honey Creek: Division A: Lake Dredging Contract and Division B: Sediment Placement Site Contract, which is to be funded locally by the Owner, will be constructed under two (2) separate contracts defined and outlined as follows:

A. Division A: Lake Dredging Contract:

The construction of sediment traps to facilitate sediment and nutrient removal at the Honey Creek tributary to Lake Shafer;

B. Division B: Sediment Placement Site Contract:

The construction of an upland earth dike containment area for sediment placement and to facilitate dewatering of sediment removed in Division A.

Bidders may elect to bid on one or both Divisions (combination bid) in order to provide the Owner with the most cost effective bid price. Bidders that elect to bid on both Divisions shall submit a separate letter with the bid indicating the amount of deduct that will be made if the bidder is awarded both Divisions "A" and "B" contracts.

Plans and Specifications for the Project are on file and may be examined at the following locations:

- | | |
|--|-----------------------|
| ▶ Commonwealth Engineers, Inc. | Indianapolis, Indiana |
| ▶ Shafer-Freeman Lakes Environmental
Conservation Corporation | Monticello, Indiana |
| ▶ F.W. Dodge Office | Indianapolis, Indiana |
| ▶ Construction League | Indianapolis, Indiana |

Copies of the Specifications may be obtained from Commonwealth Engineers, Inc., at 7256 Company Drive, Indianapolis, Indiana, 46237 upon payment of a non-refundable fee of Seventy-Five Dollars (\$75.00) in the form of a check or money order made payable to Commonwealth Engineers, Inc. Requests for Specifications must also include a return **street address**; post office box numbers are not acceptable. Partial sets of Specifications are not available. Copies of any and all addenda which may be issued for this Project will be included with the purchased documents and will be forwarded to all Plan and Specification holders.

The work to be performed and the proposal to be submitted shall include sufficient and proper sums for all General Construction, Mechanical Installation, Labor, Materials, Tools, Equipment, Taxes (both Federal and State), Permits, Licenses, Insurance, Service Costs, and so forth incidental to and required for the construction of the improvements.

Each proposal must be enclosed in a sealed envelope bearing the title of the Project and the name and address of the Bidder. All proposals must be submitted on the proposal forms as identified in the Contract Documents and Specifications.

Each proposal shall be accompanied by a certified check or acceptable bidder's bond made payable to the OWNER, in a sum of not less than five percent (5%) of the total amount of the highest aggregate proposal, which check or bond will be held by the OWNER as evidence that the bidder will, if awarded the Contract, enter into the same with the OWNER upon notification from him to do so within ten (10) days of said notification.

Approved performance and payment bonds guaranteeing faithful and proper performance of the work and materials, to be executed by an acceptable surety company, will be required of the Contractor at the time he executes his contract. The bonds will be in the amount of 100% of the Contract Price and must be in full force and effect throughout the term of the Construction Contract plus a period of 12 months from the date of substantial completion.

The OWNER reserves the right to reject any proposal as may be deemed necessary or in the best interest of the OWNER, and to waive any and all informalities in bidding. Any proposal may be withdrawn prior to the above scheduled time for the opening of proposals or authorized postponement thereof. Any proposal received after the time and date specified will not be considered. NO proposal may be withdrawn after the scheduled closing time for receipt of bids for at least ninety (90) days.

In addition, the Shafer-Freeman Lakes Environmental Conservation Corporation reserves the right to reduce or eliminate portions of the projects to stay within the funds allocated for this work.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Project throughout.

Proposals shall be properly and completely executed on Indiana Form 96, included in the Specifications. Proposals shall include all information requested by Indiana Form 96 (Revised, 1987). Under Section III of Form 96 the Bidder shall submit a financial statement. A copy of the proposed Financial Statement to be submitted with the Bid is included in the Bid Proposal Documents Section of these Specifications. The OWNER may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any Bid if the evidence submitted by, or investigation of such Bidder fails to satisfy the OWNER that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the work contemplated therein.

Each Bidder is responsible for inspecting the Project site and for reading and being thoroughly familiar with the Contract Documents. The failure or omission of any Bidder to do any of the foregoing shall in no way relieve any Bidder from any obligation in respect to its Bid.

This Project has no established wage scales.

Any Contract awarded under this Advertisement for Bids is expected to be funded locally by the OWNER.

**SHAFFER-FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORP.**

/S/ Robert Coates, President

ATTEST: _____
/S/ Barbara Kawecki, Secretary

DATED: _____

PART 2

INFORMATION FOR BIDDERS

PART 2

INFORMATION FOR BIDDERS

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PART 2

INFORMATION FOR BIDDERS

1. Definitions

- Owner: The Owner shall mean the Shafer-Freeman Lakes Environmental Conservation Corporation (SFLECC). The Owner will be represented by and through its duly elected or appointed governing board or authorized agent.
- Engineer: The Engineer; Commonwealth Engineers, Inc. or their authorized agent.
- Contractor: The person, firm, partnership or corporation to whom the contracts are awarded by the Owner, and who is subject to the terms thereof.
- Contract Documents: The Contract Documents shall consist of the Specifications, Agreement, Performance Bond, Payment Bond, Notice of Award, Notice to Proceed, Contract Change Orders, the Plans and all Addenda issued thereto by Commonwealth Engineers, Inc.

2. Scope of Work

Bids are to cover the furnishing of labor and materials for constructing and making ready for use, the structures, equipment, piping, appurtenances and other works described in these Specifications and Plans, attached hereto and as further incidental or necessary for the entire satisfactory and enduring completion of each division bid upon, including the protection of all property traversed or approached.

There are two (2) divisions included in these plans and specifications. Division A is for the Dredging Contract and Division B is for the Sediment Placement Site Contract. The bidder has the right to bid both divisions or just one of the two, however.

3. Bidder's Responsibilities

Bidders shall carefully examine the entire site of the work, the adjacent premises and the various means of approach to the site, and shall make all necessary investigations to acquaint themselves thoroughly with the facilities for delivering, placing and operating the necessary construction plant, for delivering and installing the equipment specified, for handling materials at the site, and as to all difficulties that may be encountered in the complete execution of all work under the attached contracts, in accordance with the Plans and Specifications. Bidders shall examine the Specifications and Plans and any other data which may be on file in the office of the Engineer for examination by bidders.

No plea of ignorance of conditions that exist, or of conditions or difficulties that may be encountered in the execution of the work under this contract, as a result of failure to make the necessary examinations and investigations, will be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill in every detail the requirements of said contract, specifications, plans or will be accepted as a basis for any claim for extra compensation.

Upon application, all available information in the possession of the Engineer will be shown to the bidders. No information obtained from any officer, agent, or employee of the Owner shall in any way affect the risk or obligation assumed by the Contractor or relieve him from fulfilling any of the conditions of the contract.

When evaluating the Division A, Dredging Contract, the Bidder shall account for excavating utilizing a hydraulic dredge. The factors to be used in this evaluation shall include, but not be limited to:

- a. Material to be pumped
- b. Digging depth
- c. Terminal (discharge) elevation
- d. Discharge line length
- e. Cutter capability
- f. Height of work face
- g. Swing width
- h. Type of advancing mechanism
- i. Dredge efficiency
- j. Suction line size
- k. Hourly production rate
- l. Total project volume
- m. Production time required
- n. Calendar time required
- o. Trash vs production time
- p. Operational costs
- q. Limited Capacity of the Sediment Placement Site

4. Bid Requirements

Bidders are requested to carefully study and conform to the provisions of the Information for Bidders in order that their bid as submitted be regular, complete and acceptable. All proposals must be executed on the separate copies of the Proposal Forms provided with these Contract Documents and Specifications purchased from the Engineer. The proposals must be legibly written in ink or typed with all prices given in words and figures.

In case of discrepancy between the written words and the figures, the written words shall govern. In case of unit price proposals, the bidder shall fill in the unit price bid for each item and in addition thereto make an extension based on the estimated quantities. In case of incorrect totaling of amounts or where the unit bid price and the extension do not agree, the unit price shall in all cases govern in arriving at the correct extension and/or total for the purpose of comparing bids.

The Owner may consider as informal any proposal on which there is an alteration of or departure from the prescribed form. A conditional or qualified Bid or Proposal may not be accepted.

Each proposal shall be enclosed in a sealed envelope, clearly marked with the name of the project, and contract division, if applicable, in order to guard against opening prior to the time set therefor, and addressed in the manner indicated in the proposal form. The bidder shall also place his firm name and address on the outside of the envelope.

Each proposal must be signed in ink by the bidder with his full name and with his business address or place of residence. The legal status of the bidder, that is, as a corporation, partnership or an individual, must be stated in the proposal. In the case of a partnership, the name and residence of each member must be inserted, and in the case the proposal is submitted by, or on behalf of, a corporation, it must be signed in the name of such corporation by an official who is authorized to bind the bidder, and who shall also affix the corporate seal of such corporation. Such officer or agent must present legal evidence that he has lawful authority to sign such proposal, that the signature is binding upon the corporation and that the corporation has legal existence. In the event any corporation, organized and doing business under the laws of any State other than Indiana, is the successful bidder, such corporation, before a contract for said work is executed, shall present evidence that it is authorized to do business in the State of Indiana.

Any person signing a proposal as the agent of another, or of others, shall have attached thereto a power of attorney evidencing authority to sign in the name of the person for whom it is signed.

The title of the person executing the proposal or contract shall be clearly indicated beneath his signature.

Erasures or other changes with bids must be explained or noted over the signature of the bidder.

Proposals may be withdrawn at any time previous to the time for receiving and opening bids. No proposals may be withdrawn for a period of time as specified in these specifications without the consent of the Owner and/or forfeiture of the bid security to the Owner.

5. Bid Security

Unless otherwise set forth in the "Advertisement for Bids", the bid must be accompanied by a bid guaranty which shall not be less than 5 percent of the amount of the bid, and at the option of the bidder may be a certified check, bank draft, or a bid bond. No bid will be considered unless it is so guaranteed. The certified check or bank draft must be made payable to the order of the Owner. Cash deposits will not be accepted. The bid guaranty shall insure the execution of the contract and the furnishing of both performance and payment bonds by the successful bidder as specified in the Contract Documents. In the case the bid guaranty is in the form of a certified check or bank draft, the Owner will return same to the unsuccessful bidder as soon as practicable after the opening of bids and the determination of the low bidder.

In the event that the party to whom the contract is awarded shall fail or neglect to execute the contract and furnish a satisfactory bond within ten (10) days after the Owner has notified him that the contract is ready for execution, the Owner may determine that the bidder abandoned the contract and thereupon the proposal and acceptance shall be null and void, and the security accompanying the proposal shall be forfeited to and retained by the Owner as liquidated damages for such failure and neglect, and to indemnify the Owner for any loss which may be sustained by failure of the bidder to execute the contract and furnish bond as aforesaid. After the execution of the contract and the acceptance of the bond by the Owner, the bid securities which have been retained by the Owner shall be returned to the respective bidders.

The Contractor shall include in his bid price or prices the cost of all insurance set forth in these Specifications.

6. Bidder's Proposal

The bid shall be completely executed on Form 96 (Revised 1987) as contained in the Bid Proposal Documents Section of the Specifications. In addition, as a part of complying with Section III of Form 96, the Bidder shall completely execute and submit with this bid the Financial Statement, included with these Specifications.

The Owner shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform the work and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The right is reserved to reject any bid where an investigation of the evidence or information submitted by such bidder does not satisfy the Owner that the bidder is qualified to carry out properly the terms of the Contract Documents.

7. Exemption from Indiana Sales Tax

Attention of the bidders is called to the fact that the Owner is exempt from the Indiana Gross Retail Tax Act (sales tax). All materials incorporated as a material or integral part of construction work for the State, County, Township, Municipality, its agencies and instrumentalities are exempt from this tax. The authorized person will furnish upon request to the successful bidder any needed information for purposes of filling-out the Exemption Certificate form.

It is not a blanket exception but it provides that only the purchase of tangible personal property used by the Owner may be purchased exempt from sales tax. The Contractor shall apply for an "Exemption Certificate for Construction Contractors", Form ST-134, Indiana Department of Revenue.

The bidder shall include in all prices offered the cost of all Federal, State and Local income taxes and all taxes imposed on materials and equipment, whether it be sales tax, processing tax or any other form of tax whatsoever with the exception of the above referenced Indiana Sales Tax.

8. Laws

Each bidder must familiarize himself with all laws, ordinances and regulations, whether Federal, State or Local, which by reason of being neglected or violated may affect the work contemplated and must secure and pay the fees required for any permits which may be necessary.

Each and every provision by law and clause required by law to be inserted in this contract, shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein. If through a mistake or otherwise any such provision that is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

9. Award of Contract and Rejection of Bids

An award of contract will be made to the low, responsive, responsible bidder.

In determining the low, responsive, responsible bidder, the Owner reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in the interest of the Owner. Unbalanced bids will be regarded with disfavor.

The Owner may elect to make a tentative award of contract to the low, responsive, responsible bidder(s) pending the sale of bonds or the completion of other financing arrangements. In such event and upon successful completion of the necessary arrangements to fund the total cost of the project, the Owner and the successful bidder to whom the tentative award has been made shall enter into a written contract at the price stated in the proposal and as specified; provided that the elapsed time from the date of the receipt of bids, as required by these specifications, has not expired. The time for execution of the written contract may be extended beyond the period set forth in these Specifications, if such time extension is mutually agreeable to the Owner and the successful bidder. This mutually agreeable extension must be done at no additional cost to the Owner.

In the determination of the low, responsive, responsible bidder, the Owner reserves the right to take into account and give reasonable weight to the following factors:

- 1.) The extent of the bidder's experience on work of the nature involved.
- 2.) The bidder's record as to dependability in the carrying out of other contracts.
- 3.) The probability of the contract being carried to successful completion within the time specified by the methods and with the equipment the bidder proposes to use.
- 4.) Does he have a suitable financial status to meet his obligations.

10. Performance Bond, Payment Bond and Execution of Contracts

The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond within ten (10) calendar days from the date when the Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Contract and Bond forms.

The successful bidder shall furnish both a Performance Bond and Payment Bond, each in the amount of 100 percent of the Contract Price, with a Surety approvable by the Owner. Copies of the form of bonds are included in the Contract Documents. Attorneys-in-fact who sign the Performance and Payment Bonds must file with each bond a certified and effective dated copy of their power of attorney.

In the case of failure of the bidder to execute the Contract and furnish said Performance Bond and Payment Bond within said time, the Owner may at his option consider the bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.

The Owner within ten (10) days of receipt of acceptable Performance Bond, Payment Bond and Contract signed by the party to whom the Contract was awarded shall sign the Contract and return to such party an executed duplicate of the Contract. Should the Owner

not execute the Contract within such period, the bidder may by written notice withdraw his signed Contract. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

The Notice to Proceed may be issued to the Contractor within ten (10) days after the signing of the Construction contract. Should there be reasons why the Notice to Proceed cannot be issued within such period, then the time may be extended by mutual agreement between the Owner and the Contractor.

The Contractor must also furnish to the Owner, with the execution of a contract, a Certificate of Insurance issued by the insurer qualified to do business in the State of Indiana, certifying that he is covered by Workmen's Compensation in accordance with statutory requirements and by insurance against public liability and property damage sufficient to cover any claims which may arise out of performance of the work under the proposed contract.

11. Time for Completion and Liquidated Damages

The Contractor shall commence work on or before the date specified in the written "Notice to Proceed" from the Owner and shall fully complete the project within the time specified in the Specifications.

For every calendar day that full completion is delayed beyond the time specified, a specified sum shall be paid by the Contractor to the Owner and it is hereby agreed by both parties that such costs and expenses represent liquidated damages caused by the delay of completion.

The time limit in number of calendar days from the date of the Notice to Proceed and the amount to be charged as liquidated damages shall be as set out in these Specifications.

In estimating the time necessary for completing the job, allowance has been made, so far as possible, for all the ordinary delays and hindrances incidental to such work, i.e., weather, delays in securing materials, workmen or otherwise.

12. Completion of Plans and Specifications

Upon issuance to prospective bidders, the physical make-up and content of the plans, specifications and contract documents is intended to be complete for preparing and submitting of a proposal. However, each bidder shall verify to his own satisfaction that all material issued to him is indeed complete. Should he discover that a page, sheet, etc. is missing he shall notify the Engineer in writing and it will be forwarded to him. After bids have been submitted, no claims of ignorance of these requirements of bidding or of construction due to such missing or overlooked material will be recognized.

13. Interpretations

In general, no answer will be given in reply to an oral question if the question involves an interpretation of the intent or meaning of the drawings or contract documents, or the equality or use of products or methods other than those definitely designated or described on the plans or in the specifications. Any information given to the bidders other than by means of the plans and contract documents or by addenda as described below is given informally and shall not be used as the basis of a claim against the Owner or the Engineer.

To receive consideration, such questions shall be submitted in writing to the Owner at least seven days before the advertised date for receipt of bids. If the question involves equality or use of products or methods, it must be accompanied by drawings, specifications, or other data, in sufficient detail to enable the Owner to determine the equality of suitability of the product or method. In general the Owner will neither approve nor disapprove particular products prior to the opening of bids; such products will be considered when offered by the Contractor for incorporation into the work.

The Owner will arrange as addenda, which shall become a part of the contract, all questions received as above provided with his decision regarding each. At least five days prior to the receipt of bids, he will send a copy of those addenda to each of those who have taken out the plans and contract documents.

Unless such action shall have been taken by the Contractor and approval obtained, he agrees to use the product or method designated or described in the specifications as amended by these addenda.

Each bidder shall acknowledge receipt of all addenda issued, by number, on his proposal form.

14. Local Features and Underground Information

The attention of the bidders is directed to the information given on the plans or shown in the Specifications relating to soundings and borings, materials encountered, ground water, subsurface conditions and existing pipes, conduits and other structures. This information is from the best available sources presently available to the Owner. All such information and the plans of the existing construction are furnished only for the information and convenience of the bidder.

It is agreed and understood that the Owner does not warrant or guarantee that the materials, conditions, and pipes or other structures encountered during construction will be the same as those indicated by the boring samples or by the information given on the drawings or in the Contract Documents. The bidder must satisfy himself regarding the character, quantities, and conditions of the various materials and the work to be done. It further is agreed and understood that the bidder or the Contractor will not use any of the information made available to him or obtained in any examination made by him in any manner as a basis or ground of claim or demand of any variance which may exist between the information offered and the actual materials or structures encountered during the construction work, except as may otherwise be provided for in the Contract Documents.

It is further understood and agreed that the bidder or the Contractor will not use any information made available to him or obtained by any examination made by him in any manner as a basis or ground of claim or demand of any nature against the Owner or Engineers, arising from or by reason of any variance which may exist between the information offered and the actual materials and structures encountered during the construction work.

15. Modification Prior to Bid Opening

The right is reserved, as the interest of the Owner may require, to revise or amend the specifications and/or drawings prior to the date set for opening bids. Such revisions and amendments, if any, will be announced by an addendum or addenda to the Contract Documents.

Copies of such addenda as may be issued will be furnished to all prospective bidders. If the revisions and amendments are of a nature which requires material changes in quantities or prices bid or both, the date set for opening bids may be postponed by such number of days as in the opinion of the Owner's Engineer will enable bidders to revise their bids. In such case, the addendum will include an announcement of the new date for opening bids.

16. Wage Scales NOT APPLICABLE FOR AREA 1

17. Safety and Health Regulations for Construction

The successful bidder shall be responsible for all obligations prescribed as employer obligations under Chapter XVII of Title 29, Code of Federal Regulations for Construction, OSHA (PL 91-596) and the Contract Work Hours and Safety Standards Act (PL 91-54).

All questions regarding compliance and enforcement, as well as requests for the regulations, should be directed to the Department of Labor.

18. Responsibility of the Contractor

Attention here is particularly directed to the provisions of the Contract whereby the Contractor shall be responsible for any loss or damage which may occur during process of the work or any part thereof, and also whereby the Contractor shall make good any faulty work or material which becomes evident within twelve months after its substantial completion, unless otherwise specified elsewhere herein.

19. Outside Interests

No official of the Owner who is authorized in such capacity on behalf of the Owner to negotiate, make, accept, or approve or the taking part in negotiating, making, accepting, or approving, any engineering, inspection, construction or material supply contracts or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in the contract or in any part thereof. No officer, employee, attorney, engineer or inspector of or for the Owner, who is authorized in such capacity on behalf of the Owner to exercise any legislative, executive, supervisory, or other similar functions in connection with the construction of the project shall become directly or indirectly interested personally in this contract or any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

20. Items to be Submitted with Bid

The bidder shall submit as a part of his bid the following:

- A. Contractors Bid and Bid Schedule (A and/or B) - completely executed and signed. (Executed) Indiana State Bid Form No. 96 (Revised, 1987), completely signed and executed.
- B. Non-Collusion Affidavit - Completely executed, signed and notarized (Standard Form 96 Revised, 1987)
- C. Bid Bond - acceptable bidder's bond or certified check in the amount of not less than five (5%) percent of the total bid price.
- D. Financial Statement for Bidders - completely signed and executed.
- E. Letter indicating **deduct** amount if Bidder is awarded both Divisions "A" and "B" contracts.

PART 3

GENERAL CONDITIONS

GENERAL CONDITIONS

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| 3. Schedules, Reports and Records | 19. Payments to Contractor |
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| 16. Correction of Work | 32. Environmental Requirements |

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated and shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications, or corrections.

1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BIDDER - Any person, firm, or corporation submitting a BID for the WORK.

1.5 BONDS - Bid, Performance, and Payment Bonds and other instruments of surety, furnished by the CONTRACTOR and the CONTRACTOR'S surety in accordance with the CONTRACT DOCUMENTS.

1.6 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion, or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7 CONTRACT DOCUMENTS - The contract, including Advertisement For Bids, Information For BIDDERS, BID, BID BOND, Agreement, Payment BOND, Performance BOND, NOTICE OF Award, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8 CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

- 1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.
- 1.10 CONTRACTOR - The person, firm, or corporation with whom the OWNER has executed the Agreement.
- 1.11 DRAWINGS - The parts of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.
- 1.12 ENGINEER - The person, firm, or corporation named as such in the CONTRACT DOCUMENTS.
- 1.13 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.
- 1.14 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.
- 1.15 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him/her to proceed with the WORK and establishing the date for commencement of the WORK.
- 1.16 OWNER - A public or quasi-public body or authority, corporation, association, partnership, or an individual for whom the WORK is to be performed.
- 1.17 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.
- 1.18 RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.
- 1.19 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUB-CONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.
- 1.20 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- 1.21 SUBCONTRACTOR - An individual, firm, or corporation having a direct contract with CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.
- 1.22 SUBSTANTIAL COMPLETION - That date certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.
- 1.23 SUPPLEMENTAL GENERAL CONDITIONS - Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

1.24 SUPPLIER - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.25 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated in the PROJECT.

1.26 WRITTEN NOTICE - Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address, or delivered in person to said party or their authorized representative on the WORK.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instructions thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress scheduled showing the order in which the CONTRACTOR proposes to carry on the WORK, including dates at which the various parts of the WORK will be started, estimated date of completion of each part and, as applicable:

3.2.1 The dates at which special detail drawings will be required; and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

3.3 The CONTRACTOR shall also submit a schedule of payments that the CONTRACTOR anticipates will be earned during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the CONTRACTOR after discovery or such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidence by a CHANGE ORDER.

5.2 When submitted for the ENGINEER's review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring the SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies, and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5 Materials, supplies, or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the CONTRACTOR.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide at the CONTRACTOR'S expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

7.5 Inspections, tests, or approvals by the engineer or others shall not relieve the CONTRACTOR from the obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ENGINEER and the ENGINEER'S representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records or personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for the ENGINEER'S observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, if, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article, or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue numbers, it shall be understood that this is referenced for the purpose of defining the

performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 The CONTRACTOR shall pay all applicable royalties and license fees, and shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or product of a particular manufacturer or manufacturers is specified, however, if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, the CONTRACTOR shall be responsible for such loss unless the CONTRACTOR promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pipe locations and other working points, lines, elevations and cut sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, shall be charged with the resulting expense and shall be responsible for any mistake that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, the CONTRACTOR shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY, AND PERSONS

11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR will take all necessary precautions for the safety of, will provide the necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The CONTRACTOR will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone of whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER, of the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instructions or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. The CONTRACTOR will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2 The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles the CONTRACTOR to a change in CONTRACT PRICE or TIME, or both, in which event the CONTRACTOR shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

- a. Unit prices previously approved.
- b. An agreed lump sum.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1 The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

15.4.1 To any preference, priority or allocation order duly issued by the OWNER.

15.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

15.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

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16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and reexecute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER by WRITTEN NOTICE of:

17.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

17.2 The OWNER shall promptly investigate the conditions, and if it is found that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless the required WRITTEN NOTICE has been given; provided that the OWNER may, if the OWNER determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION, AND DELAY

18.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

18.2 If the CONTRACTOR is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of its creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of its property, or if CONTRACTOR files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or disregards the authority of the ENGINEER,

or otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and its surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method the OWNER may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the CONTRACT. In such case the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER, terminate the CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to the OWNER and the ENGINEER stop the WORK until paid all amounts then due, in which event and upon resumption of the WORK CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. PAYMENT TO CONTRACTOR

19.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of

materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect the OWNER'S interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing approval of payment, and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing the reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retainage. The retainage shall be an amount equal to 10% of said estimate until 50% of the work has been completed. At 50% completion, further partial payments shall be made in full to the CONTRACTOR and no additional amounts may be retained unless the ENGINEER certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the CONTRACTOR. At 50% completion or any time thereafter when the progress of the WORK is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 10% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the CONTRACTOR. When the WORK has been substantially completed except for WORK which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the OWNER are valid reasons for noncompletion, the OWNER may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the WORK still to be completed.

19.2 The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

19.4 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demand of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and

parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, the CONTRACTOR'S Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or its sureties from any obligations under the CONTRACT DOCUMENTS or the Performance and Payment BONDS.

21. INSURANCE

21.1 The CONTRACTOR shall purchase and maintain such insurance as will protect it from claims set forth below which may arise out of, or result from, the CONTRACTOR'S execution of the WORK, whether such execution be by the CONTRACTOR, any SUBCONTRACTOR, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

21.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts;

21.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of employees;

21.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than employees;

21.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

21.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

21.2 Certificates of Insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be cancelled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER.

21.3 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, Liability insurance as hereinafter specified:

21.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting the CONTRACTOR from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by the CONTRACTOR or by any SUBCONTRACTOR employed by the CONTRACTOR or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR employed by the CONTRACTOR. Insurance shall be written with a limit of liability of not less than \$500,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than \$500,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than \$200,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$200,000 aggregate for any such damage sustained by two or more persons in any one accident.

21.3.2 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

21.4 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the WORK is performed, Workmen's Compensation Insurance, including occupational disease provisions, for all of the CONTRACTOR'S employees at the site of the PROJECT and in case any WORK is sublet; the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of its employees not otherwise protected.

21.5 The CONTRACTOR shall secure, if applicable, "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the OWNER. The policy shall name as the insured the CONTRACTOR, and the OWNER.

22. CONTRACT SECURITY

22.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a Performance BOND and a Payment BOND in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

23.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of any right, title or interest therein, or any obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

24.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, its agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. SEPARATE CONTRACTS

25.1 The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTOR'S reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate the WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT or the OWNER may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTOR'S who are parties to such CONTRACTS (or the OWNER, if the OWNER is performing the additional WORK) reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate the WORK with theirs.

25.3 If the performance of additional WORK by other CONTRACTOR'S or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves it in additional expense or entitles it to an extension of the CONTRACT TIME, the CONTRACTOR may make a claim thereof as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of its SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by it.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and give the CONTRACTOR the same power as regards terminating any Subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5 Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR and the OWNER.

27. ENGINEER'S AUTHORITY

27.1 The ENGINEER shall act as the OWNER'S representative during the construction period, shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed, and shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship, and execution of the WORK. Inspections may be at the factory or fabrication plant of the source of material supply.

27.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

27.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

28.3 The CONTRACTOR shall provide at its own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTEE

29.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of the damage of other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

30. ARBITRATION BY MUTUAL AGREEMENT

30.1 All claims, disputes, and other matters in question arising out of, or relating to, the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by the making an acceptance of final payment as provided by

Section 20, may be decided by arbitration if the parties mutually agree. Any agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgement may be entered upon it in any court having jurisdiction thereof.

30.2 Notice of the request for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and a copy shall be filed with the ENGINEER. Request for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.

30.3 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

31. TAXES

31.1 The CONTRACTOR will pay all sales, consumer, use, and other similar taxes required by the laws of the place where the WORK is performed.

32. ENVIRONMENTAL REQUIREMENTS (Added 09-16-92, PN 191.)

The CONTRACTOR, when constructing a project involving trenching and/or other related earth excavation, shall comply with the following environmental constraints.

32.1 WETLANDS - The CONTRACTOR, when disposing of excess, spoil, or other construction materials on public or private property, WILL NOT FILL IN or otherwise CONVERT WETLANDS.

32.2 FLOODPLAINS - The CONTRACTOR, when disposing of excess, spoil, or other construction materials on public or private property, WILL NOT FILL IN or otherwise CONVERT 100 YEAR FLOODPLAIN areas delineated on the latest FEMA Floodplain Maps.

32.3 HISTORIC PRESERVATION - Any excavation by the Contractor that uncovers an historical or archaeological artifact shall be immediately reported to the PROJECT ENGINEER and a representative of the OWNER. Construction shall be temporarily halted pending the notification process and further directions issued by the OWNER after consultation with the State Historic Preservation Officer (SHPO).

32.4 ENDANGERED SPECIES - The CONTRACTOR shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of the CONTRACTOR, the CONTRACTOR will immediately report this evidence to the PROJECT ENGINEER and a representative of the OWNER. Construction shall be temporarily halted pending the notification process and further directions issued by the OWNER after consultation with the U.S. Fish and Wildlife Service.

PART 4

SUPPLEMENTAL GENERAL CONDITIONS

(NOT APPLICABLE)

PART 5

GENERAL CONSTRUCTION SPECIFICATIONS

PART 5

GENERAL CONSTRUCTION SPECIFICATIONS

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PART 5

GENERAL CONSTRUCTION SPECIFICATIONS

1. Foreword

The work specified to be done by the Contractor in the following sections under the "General Construction Specifications" is to be done at the expense of the Contractor and will not be measured in determining quantities for payment unless otherwise specified.

The unit and lump sum prices stated in the Contract hereto attached to be paid for work under the respective Items shall be full compensation for all work set forth herein under these General Construction Specifications.

2. Temporary Toilet Accommodations

The Contractor shall furnish, install and maintain ample sanitary facilities for the workmen; toilets shall be placed at the time work starts. These temporary toilet facilities shall be placed and maintained as required by the local health ordinances. He shall provide the necessary temporary enclosures to accommodate the toilets. The toilets shall be maintained in a sanitary condition and contents removed from premises as often as required.

3. Noise Prevention

The Contractor shall eliminate noise to as great an extent as possible at all times. Air compressors shall be equipped with silencers and the exhausts of all gasoline motors and other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools special precautions shall be taken to avoid noise and other nuisance, and the Contractor shall require strict observance of all pertinent ordinances and regulations. Blasting, in such locations, shall be done with reduced charges.

4. Dust Prevention

The Contractor shall apply an approved dust preventative as necessary to avoid and eliminate dust complaints from nearby residents, the cost of which shall be included in the prices bid for the various parts of the work.

5. Smoke Prevention

A strict compliance with all ordinances regulating the production and emission of smoke will be required and the Contractor shall accept full responsibility for all damage that may occur to property as a result of negligence in providing required control.

The Contractor will be held responsible for damage to any structures on the site due to emission of smoke and steam from his plant.

6. Temporary Heat

The Contractor shall provide such temporary heat as may be required to carry out all portions of the work and to prevent damage due to cold weather.

The Contractor shall, at his own expense, furnish, install, connect, operate and maintain all required temporary heating equipment, of an approved type, either gas or oil fired, with automatic safety devices and controls; properly vented to the outside of the building. He shall furnish and pay for all fuel, labor and material in connection with this temporary service.

The Contractor shall be responsible for all damage due to his failure to maintain required temperatures for any phase of construction, or improper use of equipment, and shall make good any damages which may result both direct and contingent.

7. Temporary Light and Electrical Power

The Contractor shall arrange and pay for separate temporary service necessary to provide temporary electric power used during construction and temporary electric lighting for all portions of the work. This cost includes any deposit(s) required on meters.

The Contractor shall make all necessary temporary electrical power installations, arrange for its distribution, continue its service throughout and remove same at the completion of the project. The Contractor shall pay for all costs incidental to installation and distribution, providing all necessary labor and materials.

The Contractor shall also provide continuous and adequate lighting meeting OSHA Standards for all phases of the project.

The temporary power service shall consist of a minimum size of one (1) 100 ampere fused NEMA 4 raintight switch rated for 115/230 volt, 1-phase, 3-wire. From the fused switch a 100 ampere 3 wire feeders is to run to a fused temporary distribution panel located either on a temporary pole and all power and lighting circuits taken from this panel. Temporary power lines shall provide 120 volt, 20 amp. receptacles within 50 feet of any portion of the construction. All elements of the temporary electrical power shall conform to the NEC, Life Safety Code 101 and OSHA regulations.

8. Temporary Water

It shall be the Contractor's responsibility to obtain and pay for all water used in the construction progress. The Contractor may arrange for his water supply through the local water company or through any other means at this disposal.

9. Cutting, Fitting and Patching

The Contractor shall make all connections to existing facilities and shall do all cutting, fitting and/or patching of the existing pipes or work of other Contractors in order to make the several parts fit together as shown or reasonably implied by the plans and specifications.

Any damages caused by negligent or ill timed work shall be at the expense of the Contractor.

The Contractor shall not endanger any work by cutting, digging or otherwise, and shall not cut or alter the work of any other contractor without the consent of the Engineer or the Owner's authorized representative.

10. Cleaning Up

The Contractor shall at all times keep the premises and haul roads free from accumulations of waste material, debris, rubbish, scrap, etc. caused by his employees or construction operations. Upon completion of the work, he shall systematically clean and make any needed repairs of structures; remove all equipment, tools and surplus materials; leave structures and roads "broom clean", or its equivalent, and the premises in a neat and clean condition.

11. Engineer's and/or Inspector's Responsibility with Respect to OSHA

The Engineer's and/or Inspector's in the performance of their duties shall not be responsible for the initiation or compliance of the safety of construction methods or procedures unless in his opinion it concerns permanent installations or permanent equipment. The Engineers and/or Inspectors shall not be held responsible for the initiation or enforcement of any OSHA Standards. The Engineer's and/or Inspector's responsibility, herein, lies solely in the design and inspection of permanent structures and permanently installed equipment.

12. Buoyant Forces and Dewatering

Due to the possibility of a high ground water table within the limits of the project, all utilities and structures may be subjected to a buoyant force during construction. The Contractor shall be responsible for any and all damages due to flotation prior to final acceptance of the work.

The Contractor shall assume all responsibility for claims resulting from damage to any land, wells, structures or improvements due to his dewatering operations.

13. As Built Drawings

The Contractor shall keep one (1) copy of all project specifications, plans, addenda, modifications, supplemental drawings, shop drawings and change orders at the project site in good order and annotated to show all changes made during the construction process. In addition, the Contractor shall keep one (1) set of "As-Built Drawings" for the project. These As-Built drawings will show all final elevations, all final dimensions and sizes for pipes and structures, and all other information as necessary to constitute As-Built records. In addition, these As-Built Drawings shall show pertinent information on all existing structures and utilities encountered during construction. These documents shall be kept daily by the Contractor and routinely checked by the Inspector for completeness and accuracy based on the Inspector's daily records and notes. It will be the Contractor's responsibility to furnish any and all information lost due to the Contractor's loss of these record drawings. In addition to other Contract requirements, retainage will be partially based on the Contractor's ability to maintain good As-Built records, as determined by the Engineer. Upon completion of the project or beneficial occupancy, whichever occurs first, these record "As-Built" drawings together with any other annotated supplemental plans, drawings, sketches, etc. shall be delivered to the Inspector for his final review and approval. If approved, the documents will be delivered to the Engineer for the Owner's record. If disapproved, they will be returned to the Contractor for corrections, as necessary.

14. Shop Drawings

Unless otherwise directed, the number of shop drawings to be submitted by the Contractor for the Engineer's approval shall be six (6), which upon approval will be distributed as follows: three to be returned to Contractor and one each for Engineer's office, field Representative, and Owner.

15. Plan Notes

Where notes on the plans indicate that certain work, material and equipment is to be furnished as part of the work under a specified Item number, and the work, material and equipment is not included in the specifications; this work, material and equipment shall be included as though it were actually written in the specifications.

16. Field Office **Not Applicable**

17. Easements

A. Rights in Easements

The Contractor has the right, during construction to use the property shown as Easement and Temporary Construction Easement and the right of ingress and egress to and from these easements for construction. However, the Contractor, prior to exercising this right, shall obtain permission of the landowner to travel over a mutually agreeable route.

Furthermore, the Contractor shall assume full responsibility for claims resulting from damage to any land or improvements used for ingress and egress to such easements.

It shall also be his responsibility to obtain, in writing, any additional rights he may require over the remaining property for his construction.

B. Work in Easements

All work in easements shall be performed in accordance with the Specifications and the following special requirements:

The Contractor shall notify each property owner of his schedule to work in the easement on their property before he enters upon their property.

In the event the Contractor damages or destroys any septic tanks and/or laterals, sand filters, and dry wells as the result of his operations on private property, he shall handle the flow immediately, and thereafter until they are restored, and restore them to their original condition or as directed by the Engineer.

As a part of the project, the Owner has acquired certain temporary (construction) easements. The Contractor is responsible for replacing trees and/or shrubs damaged by him during construction at his own expense.

18. Construction Schedules

The Construction Schedule to be supplied by the Contractor per Section 3 of the General Conditions shall be of the bar chart type and containing the information per the General Conditions. The Construction Schedule shall be adjusted monthly, as necessary, to reflect current conditions. The Contractor shall request any increases in time due to abnormal weather conditions, strikes, etc. on a monthly basis and a time extension change order shall be processed accordingly.

The Construction Schedule should show a completion date that meets the constructions time allotted by the Contract Documents.

19. Notification by Contractor Prior to Construction

Sufficient notice shall be given by the Contractor to all utilities and property owners whose pipes, poles, tracks, wires, conduits or other structure may be affected by the work in order that they may protect, remove, adjust or rebuild them, or take such measures as they may desire to minimize inconvenience. He shall notify the local fire and law agencies twenty-four (24) hours in advance of the temporary blocking of any street. He shall also notify any effected water works utility and receive its authorized representative's approval before cutting into existing mains or shutting off main line services, except in case of emergency.

20. Traffic Control

The Contractor may close streets or roads to through traffic for minimum periods of time if approved by the appropriate authority and with proper notice to local occupants of all premises, police and fire protection authorities and other public authorities as applicable. The Contractor shall so schedule this work that this time is minimum and shall, whenever possible, make suitable provisions for access by local residents, school buses, police and fire emergency vehicles and mail delivery vehicles. The Contractor shall keep fire hydrants and other public utility valves accessible at all times.

At street or road crossings where the Contractor is permitted to open cut the trench, the crossing shall be completed, cleaned up, temporary pavement in place, and open to traffic within twenty-four (24) hours from the time the street or road is closed to through traffic, unless specific approval is received from the authority having jurisdiction, for a longer period.

When it is required that a street or road be closed to traffic, the Contractor shall furnish, erect and maintain barricades, suitable and sufficient red lights and other lights or reflecting material at the limits of the Project.

Where side streets intersect and at other points of public access to the project, the Contractor shall furnish, erect and maintain advance warning signs and barricades to direct traffic from closed sections.

The Contractor shall furnish, erect and maintain detour marking signs on temporary routes, except where same may be furnished by the State or County Highway Departments.

Throughout construction, the Contractor shall furnish, erect and maintain such lights, signs and barricades as may be required for the protection of any local traffic permitted on the roadway.

Where the improvement is to be accomplished with traffic maintained, the Contractor shall furnish, erect and maintain lights, signs, barricades, temporary guard rails and other traffic control devices, watchmen and flagmen as may be necessary to maintain safe traffic conditions.

21. Safety and Health Requirements

The successful bidder shall be responsible for all obligations prescribed as employer obligations under Chapter XVII of Title 29, Code of Federal Regulations for Construction, OSHA (PL 91-596) and the Contract Work Hours and Safety Standards (PL 91-54).

22. Permits

The Contractor shall provide and display any and all Permits required by Federal, State, County, Township, and/or Conservation Corporation prior to the start of construction.

PART 6

WORKMANSHIP AND MATERIALS

PART 6

WORKMANSHIP AND MATERIALS SPECIFICATIONS

LAKE SHAFER - LAKE ENHANCEMENT PROJECT

AREA 1: HONEY CREEK

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WORKMANSHIP AND MATERIALS SPECIFICATIONS

(SECTION WM 1)

GENERAL

The following specifications for Workmanship and Materials are of general application, and are to be used with the Detailed Specifications and drawings as far as applicable.

The Sections of the Workmanship and Materials Specifications shall accompany or be attached to each set of the Detailed Specifications. Additional Sections of Workmanship and Materials Specifications, other than those listed, may be included as a part of the contract documents attached to the listed Sections.

Materials for which no detailed specifications are given herein or under the Detailed Specifications shall in general conform to the physical characteristics and methods of treatment as set forth in the latest specifications of the American Society for Testing Materials insofar as they may apply, and shall be of the quality and character best adapted to the purpose for which they are to be used. No material shall be used for any purpose unless the material has previously been in use for a like purpose for a sufficient length of time to demonstrate the materials' satisfactory use.

All materials and equipment to be provided by the Contractor under this contract shall be new, unless otherwise specified. Any equipment offered shall be new and of a make and type which can be shown to have operated satisfactorily and continually in actual service for a sufficient length of time to demonstrate the equipment's success for the purpose for which the equipment is to be used.

(SECTION WM 2)

EXCAVATION

Description

The Contractor shall make all earth excavations required, to the widths and depths necessary for proper construction (and only to such widths and depths), for constructing according to the plans, all structures included in this contract. Earth shall mean all kinds of materials, wet and/or dry, excavated, or which are to be excavated, including rock, shale, hardpan, muck, quicksand, etc., unless provisions are made elsewhere in the contract documents for specified soil types.

Excavation shall include clearing the site for the work; the loosening, loading, removing, transporting, and disposing of all materials, wet or dry, necessary to be removed for purposes of construction; all sheeting and bracing; all draining, dewatering and pumping; backfilling of trenches, excavations and pits; earth borrow; the supporting of the excavations and structures (new and existing) above and below ground; the handling of water; and all incidental work.

General

Prior to commencing construction operations, the Contractor shall make all the provisions necessary to assure the protection of all existing improvements, both public and private. He shall protect trees, shrubs, plantings and grassed areas and shall make provisions for maintaining public travel in an acceptable manner.

Clearing

Preparatory to excavation, the site of all open cut excavations, embankments and fills shall be first cleared of obstructions and existing facilities (except those which must remain temporarily or permanently in service). On all public or private property where grants or easements have been obtained, and on the property of the Owner, the Contractor shall remove and keep separate the topsoil, and shall carefully replace it after the backfilling is completed.

Pavement Cutting

Prior to excavating paved areas all excavation edges falling within the pavement shall be saw cut in a neat straight manner. Cutting shall be performed with a saw designed specifically for this purpose. The cut shall penetrate the entire pavement thickness where possible. If the existing pavement is more than 6 inches thick then a cut of not less than 6 inch depth shall be made. Sawing equipment shall be submitted to the Engineer for approval before initial use. When the approved cutting equipment makes a cut more than 1" wide the cutting shall precede the excavation no more than one block or 400 feet which ever is less. If pavement cuts (those less than 1 inch wide) are made in streets which are reopened to traffic prior to excavation then the cuts shall be thoroughly filled with sand and maintained full until the excavation is performed.

Protection of Existing Improvements

Before any excavation is started, adequate protection shall be provided for all lawns, trees, shrubs, landscape work, fences, sidewalks, hydrants, utility poles, street, alley and driveway paving, curbs, storm sewers, ditches, headwalls, catch basins, surface inlets and all other improvements that are to remain in place. Such protection shall be provided as long as necessary to prevent damage from the Contractor's operations. Shrubs, bushes, small trees and flowers, which have to be removed to permit excavation for the project, shall be protected and replanted or replaced when the backfill is complete unless otherwise directed by the Engineer.

The Contractor shall exercise every precaution to prevent damage to property within and outside the immediate vicinity of the work. He shall remove all debris and rock from the site and restore the ground surfaces, replace or repair all driveways, buildings, fences, retaining walls, culverts, drains, paving, sidewalks, etc., which are removed or damaged during construction.

Repair, restoration or replacement of any improvements damaged or removed outside of the work to be performed shall be the obligation of the Contractor at no additional cost to the Owner.

Protection of Trees and Shrubs

No existing trees or shrubs in street Rights-of-Way and easements shall be damaged or destroyed. Where branches of trees or shrubs interfere with the Contractor's operations, they shall be protected by tying back wherever possible. No limbs or branches shall be cut. If his operations will not permit saving certain trees, the Contractor shall be wholly responsible for satisfying all claims for restoration or restitution resulting from their damage or removal.

If small trees and shrubs are moved or pruned to permit more working space pruning shall be done in accordance with Home and Garden Bulletin No. 83, U.S. Department of Agriculture, "Pruning Shade Trees and Repairing Their Injuries." However, the Contractor shall obtain, in writing, the property owner's permission to move or prune trees or shrubs on his property.

Trees and shrubs damaged by the Contractor's operation shall be repaired in accordance with said Bulletin No. 83.

Payment for protecting trees and shrubs shall be the obligation of the Contractor at no additional cost to the Owner.

Maintenance of Public Travel

The CONTRACTOR shall carry on the WORK in a manner which will cause a minimum of interruption to traffic, and may close to through travel not more than two (2) consecutive blocks, including the cross street intersected. Where traffic must cross open trenches, the CONTRACTOR shall provide suitable bridges to street intersections and driveways. The CONTRACTOR shall post suitable signs indicating that a street is closed and necessary detour signs for the proper maintenance of traffic. Prior to closing of any streets the CONTRACTOR shall notify responsible municipal authorities.

Utility Interruption

The CONTRACTOR shall proceed with caution in the excavation and preparation of the trench or pit so that the exact location of underground structures may be determined. Prior to proceeding with trench excavation the CONTRACTOR shall contact all utility companies in the area to aid in locating their underground services.

The CONTRACTOR shall take all reasonable precautions against damage to existing utilities. However, in the event of a break in an existing water main, gas main, sewer or underground cable, he shall immediately notify the responsible official of the organization operating the utility interrupted. The CONTRACTOR shall lend all possible assistance in restoring services and shall assume all costs, charges, or claims connected with the interruption and repair of such services.

Construction in Easements

In easements across private property, the CONTRACTOR shall confine all operations in the easement area and shall be responsible and liable for all damage outside of the easement area. Trees, fences, shrubbery or other types of surface improvements located in easements will require protection during construction. Precautions shall be taken by adequate sheeting or other approved method to prevent any cave-in or subsidence beyond the easement limits or damage to improvements within the easement. In general, the easement area is intended to provide reasonable access and working area for efficient operation by the CONTRACTOR. Where easement space for efficient operation is not provided, the CONTRACTOR shall be responsible for organizing his operations to perform within the restrictions shown on the plans. When requested, the OWNER shall furnish the CONTRACTOR a copy of the construction easements. Anytime the CONTRACTOR has to work outside of the easement area, he must obtain written permission from the property owner and furnish the ENGINEER with a copy.

Drainage

The Contractor shall make provisions for handling all flows in existing creeks, ditches, sewers and trenches by pipes, flumes or other approved methods at all times when his operations would, in any way, interfere with the natural functioning of said creeks, ditches, sewers and drains. The Contractor shall at all times during construction provide and maintain sufficient equipment for the disposal of all water which enters the excavation, both in open cut trenches and in tunnels, to render such excavation firm and dry, until the structures to be built thereon are completed.

Pipe underdrains, well point systems, deep well pumps or other suitable equipment and methods shall be used to keep all excavations firm and dry, at no additional cost to the Owner unless otherwise provided in the Proposal.

Disposal of Unsuitable Materials

Excavated materials which are either surplus and not required or are unsuitable for backfilling shall be removed from the site of operations as soon as excavated. All excavated materials so removed shall be disposed of, at no additional cost to the Owner, on privately owned property for which the Contractor has made prior arrangements. The Contractor is responsible for the restoration of areas within Public Right-of-Ways bordering properties for which the Contractor has a dump permit or release.

The Contractor is to provide the Engineer with a copy of the said permit, stating the condition in which the Property Owner will accept the spoil materials.

Storage of Suitable Materials

Excavated materials suitable and required for immediate backfill, shall be stored in neat piles adjacent to the excavation in a manner so as to interfere as little as possible with traffic, but shall not be placed at such heights above or closeness to the sidewalls of the excavation to endanger such operations due to slides or cave-ins. Fire hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, or other utility controls within Right-of-Ways shall be left unobstructed and accessible until the WORK is completed.

Excavated materials suitable for use as backfill, fill and embankments but not needed immediately shall be transported to a location approved by the Engineer and stored at the contractors expense. Storage shall be on the owners property provided the site offers sufficient room without hindering the Work or the normal operation of the Owner's facilities. All weather access must be maintained to all operating facilities on the site at no additional expense to the Owner. Gutters and catch basins shall be kept clear or other satisfactory provisions made for drainage. Natural watercourses shall not be obstructed.

Open Cut Excavation

Open cut excavation, either in earth or rock, shall be safely supported and of sufficient width and depth (and only to such width and depth) to provide adequate room for the construction or installation of the work to the lines, grades and dimensions shown on the Plans.

Trench Dimensions

The bottom width of the trench at and below the top of the pipe and inside the sheeting and bracing, if used, shall not exceed the recommendations as contained in the applicable ASTM Standard for the pipe being used.

Trench sheeting and bracing or a trench shield or box shall be used as required by the rules and regulations of OSHA. The bottom of the trench shall still meet the above standards.

If the trench widths are exceeded without the written permission of the Engineer, the pipe shall be installed with a concrete cradle or with concrete encasement or other ASTM approved methods as approved by the Engineer and at no additional cost to the Owner.

Excavations With Sloping Sides, Limited

The Contractor may, at his option, where working conditions and right of way permit (as determined by the Engineer), excavate pipe line trenches and pits for structures with sloping sides, but with the following limitations:

- (1) In general, only braces and vertical trenches will be permitted in traveled streets, alleys, narrow easements and for pit excavations more than 10 feet deep.

- (2) Where pipe line trenches with sloping sides are permitted, the slopes shall not extend below the top of the pipe, and trench excavations below this point shall be made with near-vertical sides with widths not exceeding those specified herein before.
- (3) Slopes shall conform to all OSHA regulations.
- (4) When pit excavations with sloping sides are permitted, the Contractor shall assume full responsibility for all costs incurred to backfill the larger excavation in accordance with the Contract Documents including furnishing materials if adequate quantities of suitable materials are not available from those excavated on the site.

Sheeting and Bracing

The Contractor shall furnish, place and maintain adequate sheeting and bracing as may be required to support the sides of the excavation and prevent any movements of earth which could, in any way; diminish the width of the excavation to less than that necessary for proper construction; cause damage to the pipe or structure being constructed or to adjacent structures, utilities, pavements or walks; cause injury to workmen or others through movement of the adjacent earth banks; or to otherwise damage or delay the work.

- A. Materials: Sheeting may be of wood or steel and shall be of adequate strength for the excavation, subject to the approval of the Engineer, who shall have the right to order the Contractor to furnish heavier sheeting than that being used or proposed to be used by the Contractor, at no additional cost to the Owner.
- B. Additional Supports: If the Engineer is of the opinion that sufficient or proper supports have not been provided at any location, he may order additional supports installed at the expense of the Contractor, and the compliance with such orders shall not relieve or release the Contractor from his responsibility for adequately supporting the sides of the excavation.
- C. Methods: Wherever possible, the sheeting and bracing shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Care shall be taken to prevent voids outside the sheeting; but, if voids develop, they shall be immediately filled with selected sandy materials and compacted by flushing and jetting with water or as directed by the Engineer. Where drop inlets or stacks are constructed, the excavation shall be offset, as required, without additional compensation.
- D. Left in Place: The engineer may order sheeting and bracing to be left in place at locations other than shown by the Plans. Sheeting left in place may be ordered to be cut off at any specified elevation, but in no case shall it be left in the ground above an elevation eighteen (18) inches below the existing or proposed surface of the ground. All voids created by the cutting off of the sheeting to be left in place shall be immediately filled with selected sandy materials and compacted by flushing and jetting with water or as directed by the Engineer.

Sheeting and bracing left in place in open cut trenches as shown on the Plans or as ordered by the Engineer shall be paid for only in accordance with applicable provisions of the Contract Documents.

If the Contractor elects not to remove certain sheeting and bracing, he will not be paid additionally for such sheeting and bracing left in place.

- E. Not Left In Place: All sheeting and bracing not to be left in place shall be carefully removed (after the backfill is complete) so as not to endanger the pipes and other structures. All voids created by withdrawal of the sheeting shall be immediately filled with selected sandy materials and compacted by flushing and jetting with water or as approved by the Engineer.
- F. All sheeting and shoring is to be done in accordance with the Occupational Safety and Health Standards 40 CFR Part 1926 Subpart P, Excavation.

Earth Excavation

Earth materials shall be excavated so that the open cuts conform with the lines, grades and dimensions shown on the drawings.

- A. Unsuitable Foundation: When the bottom of the excavation is unsuitable as a foundation, it shall be excavated below grade and then refilled with concrete or crushed stone to the grade as the Engineer may direct. The crushed stone refill shall be mechanically compacted in six (6) inch layers or as directed by the Engineer. Such authorized work shall be paid for as set forth under the appropriate Item of the Proposal or the Change Order. This provision shall not relieve the Contractor of his obligation to dewater the excavation at no additional expense to the Owner.
- B. Unauthorized Excavation: Unauthorized excavation below grade shall be filled with crushed stone or concrete and compacted as ordered and directed by the Engineer at no additional cost to the Owner.
- C. Excavated Earth For Backfill: Excavated earth materials may be used for backfill subject to the approval of the Engineer, and the Contract Documents. Such material may be used only where its class is allowed. For example: Excavated material conforming to "Class II" description may be used where "Class II" material is required. When the Contract provides a unit price payment for classified backfill or fill material, excavated materials may qualify for such payment only if it is transported to another location for installation or temporary storage. The Contractor shall not transport the material solely to qualify it for such payments.

Rock Excavation

Rock shall be defined as follows: Boulders measuring one-half (½) cubic yard or more in volume; rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits so firmly cemented that they possess the characteristics of solid rock that cannot be removed without systematic drilling and blasting; and concrete and masonry structures, except sidewalks and paving. Pockets or seams of earth or clay less than four (4) inches in thickness, occurring below or between solid ledges of rock, shall be considered rock.

When rock is encountered in open cut excavation, it shall be removed by drilling, blasting, digging or other approved methods so that open cut trenches conform with the lines, grades and dimensions shown on the Plans.

- A. Explosives: The Contractor shall comply with all Federal, State and Local laws, rules, regulations, insurance and ordinances governing the transportation, storage, use and permits for explosives.
- B. Description: Solid rock excavation shall consist of the necessary excavation and satisfactory disposal of all rock in place which can not be removed from its original position without the use of explosives, or with a modern power shovel of not less than three-quarter (3/4) cubic yard capacity, properly used, having adequate power and in good running condition, or other equivalent powered equipment. The excavation shall also include all loose stone or boulders necessary to be removed which have a volume of one-half (1/2) cubic yard or more. Boulders of less than one-half (1/2) cubic yard in volume shall not be classed as rock excavation.
- C. Safety Precautions: When blasting is required for the removal of rock, every precaution shall be used for the protection of persons and private and public property. Each blast shall be well covered with mats or other suitable means to confine the rock fragments within the excavation. At the discretion of the Engineer, he may order an evaluation survey of properties within the blasting zone. Only the minimum amounts of explosives shall be used; no excessive charges will be permitted. Except with written permission and approval of the Engineer, no blasting of rock will be permitted at nights or on Sundays.
- D. Blasting Methods: The method of blasting will be as determined by the Contractor, subject to the approval of the Engineer prior to construction. Blasting shall be performed at a safe distance ahead of the installation of the pipe and structures to prevent damage to them as the work progresses. Blasting of rock for property service connections, T-branches, Y-branches, and stubs shall be performed at the same time as the pipe trench blasting. The rock at the ends of all pipes, branches, stubs and property service connections, shall be shattered by continuing the drilling and blasting operations six (6) feet beyond the end of the pipe, branch, stub or property service connection.

Sufficient dynamite shall be used to shatter the rock for future excavation, as may be determined and ordered by the Engineer.

The blasting of rock under existing paving prior to uncovering the rock will be permitted, provided, the Contractor assumes full responsibility for all damage to the existing paving; however, the Owner reserves the right to require the uncovering of rock prior to blasting if blasting without uncovering proves unsatisfactory.

If the Contractor chooses to blast rock under paving without uncovering the rock, he shall immediately repair humps in the paving which create a traffic hazard, as determined by the Engineer; and, all distortions outside the limits of the trench caused by this method of blasting shall later be removed and replaced as part of the paving restoration, as directed by the Engineer. The Contractor is fully responsible for all damages that occur.

- E. Repairs of Damage: In case injury occurs to any portion of the work, or to the material surrounding or supporting the same, through blasting the Contractor at his own expense shall remove such injured work and shall rebuild said work and shall replace the material surrounding or supporting the same, or shall furnish such material and perform such work of repairs or replacements as are necessary for satisfactory restoration. Any damage

whatever to any existing structure due to blasting shall be promptly, completely and satisfactorily repaired by the Contractor at his own expense.

Boring and Jacking

Construction of the pipeline by boring and jacking methods will be permitted unless otherwise specified on the plans.

Backstop: The backstop shall be of sufficient strength and positioned to support the thrust of the boring equipment without incurring any vertical or horizontal displacement during such boring operations.

Guide Rails: The guide rails for the boring equipment may be of either timber or steel. They shall be laid accurately to line and grade and maintained in this position until completion of the boring operations.

Casing Pipe: Steel casing pipe shall be new, conform to ASTM A 139 and shall be of the size (diameter) shown on the plans. The lengths of pipe shall be welded as they are installed. Where lengths of casing pipe are joined during the boring operations, care shall be taken to insure that the proper line and grade is maintained.

The minimum wall thickness for casing pipes under highways, railroads and streams shall be 0.375 inches. Steel shall be Grade B under railroads and Grade A at all other locations.

Removal of Water

The Contractor shall at all times during construction provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavations or other parts of the work and shall keep said excavations dry until the structures to be built therein are completed. No masonry shall be laid in water nor shall water be allowed to rise over masonry, until the concrete and mortar have attained a sufficient and satisfactory set. In no event shall concrete be placed in water, nor shall water be allowed in the excavation, which may set up unequal pressures in the concrete, until the concrete has set at least twenty-four (24) hours and any danger of flotation has been removed.

In order to provide a dry foundation, the Contractor, if required by the Engineers, shall pre-drain all wet material (except hardpan or rock) by lowering the ground water to a depth of at least one (1) foot below the deepest point of subgrade. The work of pre-draining shall be done by the use of a well point system, or by any other method approved by the Engineer that will permit the construction work to be carried on under dry foundation conditions. All discharge water shall be piped to the nearest point of disposal in order to prevent such water from again entering the excavation. Any method or system that may be used to lower the ground water shall be kept in operation continuously unless otherwise permitted. The Engineer's approval of the proposed system shall not relieve the Contractor from the responsibility of providing and maintaining dry excavations as required.

The Contractor shall dispose of water from the work in a suitable manner without damage to adjacent property or piping. No water shall be drained into work built or under construction unless the consent of the Engineers is first obtained.

All removal and handling of water required to maintain dry trenches or other excavations for the construction of sewers, water mains, or other structures in the dry, shall be at the expense of the Contractor.

(SECTION WM 3)

BACKFILL FILLS AND EMBANKMENTS

Description

All trenches or excavations shall be backfilled to the original surface of the ground or such other grades as shown or directed. In general the backfilling shall be carried along as speedily as possible and as soon as the concrete, mortar, and/or other masonry work and pipe joints have sufficient strength to resist the imposed load without damage.

Backfill Materials

The following materials shall be used for backfill in accordance with and in the manner indicated by the requirements specified herein.

- Class I - Angular, 6 to 40 mm (1/4 to 1 1/2 inch), graded stone such as crushed stone.
- Class II - Coarse sands and gravel with maximum particle size of 40 mm (1 1/2 inch), including various grades of sands and gravel containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW and SP are included in this class.
- Class III - Fine sand and clayey gravel including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil types GM, GC, SM and SC are included in this class.
- Class IV - Silt, silty clays and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH and CL are included in this class. These materials are not recommended for bedding. This class shall also include any excavated material free from rock (3 inches and larger), concrete, roots, stumps, rubbish, frozen material and other similar articles whose presence in the backfill would cause excessive settlement.

Backfill of Trench Excavations for Pipes and Conduits

Bedding and Backfill materials samples shall be submitted to the Engineer prior to start of construction. Approved samples shall be kept at the Engineer's field office. Materials differing significantly from these samples shall not be used without written authorization from the Engineer.

Bedding

Rigid Pipe and Conduit Bedding

For purposes of this specification, rigid pipe and conduits shall include those made of steel, ductile iron, cast iron, concrete, VCP, PVC/ABS Truss and other materials as determined by the Engineer.

All rigid conduit and pipe shall be laid to the lines and grades shown on the plans, unless otherwise directed by the Engineer. All rigid conduit and pipe shall be bedded in compacted Class I or II material, placed on a flat trench bottom. The bedding shall have a minimum thickness of 4" or one-fourth (1/4) the outside pipe diameter below the pipe and shall extend halfway up the pipe

barrel at the sides. All material shall be placed in the trench in approximately six (6) inch layers. Each layer, shall be leveled and evenly distributed on both sides of the pipe so as not to disturb, displace or damage the pipe and shall be thoroughly compacted. When Class I or II materials is used compaction may be accomplished by hand or mechanical tamping or by "walking" the material in. Bedding from the halfway point on the pipe to a point twelve (12) inches above the top of the pipe shall be a Class I, II, III, or IV material placed in six (6) inch layers and thoroughly compacted to prevent settlement. Class III and IV material shall not be used when the trench is located in an area subject to vehicular traffic.

Flexible and Semirigid Conduit Bedding

For purposes of this specification, flexible and semirigid conduits and pipes shall include those made of PVC, PE, FRP, and other materials as determined by the Engineer.

All flexible and semirigid pipe shall be laid to the lines and grades shown on the plans, unless otherwise directed by the Engineer. All flexible and semirigid conduit shall be bedded in compacted Class I or Class II material, placed on a flat trench bottom. The bedding shall have a minimum 4" thickness or one-fourth (1/4) the outside pipe diameter below the pipe and shall extend to twelve (12) inches above the top of the pipe level the full width of the trench. All material shall be placed in the trench in a maximum of six (6) inch layers (before compaction). Each layer, shall be leveled and evenly distributed on both sides of the pipe so as not to disturb, displace or damage the pipe and shall be adequately compacted. When Class I materials are used compaction may be accomplished by hand or mechanical tamping or by "walking" the material in. When Class II materials are used compaction shall be accomplished only by hand or mechanical tamping to a minimum eighty-five percent (85%) Standard Proctor Density.

When flexible conduit installation represents more than 10% of the total base bid, the Pipe or conduit manufacturer shall examine the proposed bedding materials samples and certify the suitability of same for use with his product in accordance with these specifications. In the event the manufacturer recommends an alternate bedding procedure the Contractor shall include with his pipe submittal a complete cost evaluation for installing the bedding as recommended and as required by these specifications. All cost savings shall be given the Owner by adjusting the Contract amount accordingly by Change Order. More expensive procedures shall not be acceptable unless the Contractor agrees to bear all additional costs.

Backfill Above Pipe

Method A - Backfill in Areas Not Subject to Vehicular Traffic

For purposes of this specification, trenches shall be considered subject to vehicular traffic if all or any portion of the excavation is located within four (4) feet of a roadway or alley which is routinely traveled by powered vehicles. In the event of any question regarding the susceptibility of an area to traffic, the Engineer's decision shall govern.

The trench between a level twelve (12) inches above the top of the pipe and the ground surface shall be backfilled with Class I, II, III or IV materials, as described above, deposited with mechanical equipment in such a manner that it will "flow" onto the bedding and not free fall. The Contractor shall consolidate the backfill by the back and forth travel of a suitable roller, wheeled device or other similar heavy equipment until no further settlement is obtained. Heavy equipment shall not be used until there is a cover of not less than three (3) feet over the pipes. To assist in promoting maximum settlement, the surface of the trench shall be left in a slightly rounded condition.

Periodical dressing of the backfill in the trench to promote the drainage and safety conditions shall be made during the course of the contract as required or ordered by the Engineer.

Method B - Backfill in Areas Subject to Vehicular Traffic (Mechanical Compaction)

The trench between a level of twelve (12) inches above the top of the pipe and the surface, which are located in areas subject to or possibly subject to vehicular traffic, shall be backfilled with Class I or II materials, deposited in uniform horizontal layers of two (2) feet +/- six (6) inches. Each layer shall be thoroughly compacted by mechanical tamping utilizing a crane mounted hydraulic vibratory compactors. Each layer shall be thoroughly compacted before the next succeeding layer is placed. This procedure shall be followed where trench walls remain stable during compaction. If in the opinion of the Engineer and/or his representative (inspector), the trench walls become unstable during compaction, then the Engineer and/or his representative (inspector) may authorize the Contractor to push from the back of the trench the Class I or II material into the trench the full depth, not to exceed twenty (20) lineal feet horizontally along the trench bottom and compact using the vibratory compactor in two (2) foot diagonal lifts.

The crane mounted vibratory compactors shall be capable of producing 1900 cycles per minute and have a compaction plate with the minimum dimensions of twenty-three by thirty-one (23 x 31) inches. The compactor shall be similar to those as manufactured by Allied, Ho-Pac, or equal.

When Class I or II materials do not contain sufficient moisture to obtain proper compaction, in the opinion of the Engineer and/or his representative, it shall be moistened or wetted as directed by the Engineer and/or his representative.

Granular backfill materials shall terminate at a point below finished grade sufficient to allow placement of the permanent surface materials. For portions of the surface subject to vehicular traffic, the remaining trench shall be filled with compacted aggregate base material, shaped, graded and compacted with a ten (10) ton roller. Where the permanent surface is asphalt or concrete the aggregate base thickness shall be the specified thickness of the pavement material plus six (6) inches. Where temporary cold mixed asphalt pavement is specified the compacted aggregate materials shall be stopped at required grade to accommodate the temporary pavement. Where the permanent surface is compacted aggregate the layer shall be eight (8) inches thick. In either case, the Contractor shall maintain the surface daily until the permanent pavement is placed.

For portions of the trench surface not subject to traffic the backfill material shall end eight (8) inches below the finished grade. This eight (8) inch depth shall be filled with good top soil and seeded in accordance with these Specifications. Existing top soil and sod may be used if properly separated and preserved.

The compacted aggregate base materials shall conform with the Indiana State Highway Department Standard Specifications, latest edition, for compacted Aggregate Base. In the event that suitable aggregate material, which conforms to the above specification is obtainable from the trench excavations and can be satisfactorily segregated, the Contractor may elect to use the material in lieu of purchased materials.

Density testing of the above backfilled trenches shall be the responsibility of the Contractor and shall be performed at no additional cost to the Owner. Testing shall be performed by an approved commercial testing laboratory. All backfill placed under this Method B shall be tested in accordance with AASHTO-T-99. Density testing shall be performed immediately prior to permanent pavement replacement and after the upper level of the compacted aggregate base or temporary pavement is removed to allow paving. When backfill has been placed using vibratory compaction, testing shall

be made at the exposed surface one (1) time per location and not less than one (1) test per four hundred (400) feet. All test locations shall be determined by the Engineer. Should the results of the density test show a compaction of less than ninety-five percent (95%) Standard Proctor Density, the area(s) represented by such test shall be immediately recompacted using METHOD C as specified, and at no additional cost to the Owner.

Method C - Backfill in Areas Subject to Vehicular Traffic (Jetting and Watersoaking)

In lieu of the Mechanical Compaction described in Method B above, the Contractor may compact the Class I or II materials by jetting and watersoaking in the manner described below. Except for compaction procedures of the Class I or II materials, all provisions of Method B described above shall apply to this Method C. The trench compaction shall be started at the point of lowest elevation of the trench and work up along the trench. Jetting and watersoaking shall not begin until the trench has been backfilled to within eight (8) inches of the finished surface. Jetting and water soaking is not allowed when the groundwater table is above the spring line of the pipe.

The holes through which water is injected into the backfill shall be centered over the trench backfill and at longitudinal intervals of not more than six (6) feet. Additional holes shall be provided if deemed necessary by the Engineer to secure adequate settlement. All holes shall be jetted and shall be carried to a point one (1) foot above the top of the pipe. Drilling the holes by means of augers or other mechanical means will not be permitted. Care shall be taken in jetting so as to prevent contact with, or any disturbance of the pipe.

The water shall be injected at a pressure and rate just sufficient to sink the holes at a moderate rate. After a hole has been jetted to the required depth, the water shall continue to be injected until it begins to overflow the surface. The Contractor shall, at his own expense, bore test holes at such locations as the Engineer may designate in order to determine the effectiveness of the water soaking. An approved soil auger shall be used for boring test holes. As soon as the jetting and watersoaking has been completed, all holes shall be filled with soil and compacted. Surface depressions resulting from backfill subsidence caused by jetting and watersoaking shall be filled and recompacted by tamping or rolling to the satisfaction of the Engineer.

The Contractor shall provide all piping, fittings, etc., necessary to deliver the water along the site of the work and shall arrange with the Water Company for making the necessary taps and metering. All expenses incurred for installing the pipe and hose together with the cost of the water used shall be borne by the Contractor.

Temporary Surfaces Subject to Traffic

The Contractor shall open streets to traffic immediately after completing the backfill operation. He shall accomplish this by installing the compacted aggregate base immediately after granular backfill. When temporary asphalt pavement is required this shall also be installed immediately. The use of class II backfill as a temporary surface is specifically prohibited. When using Method C backfilling, the Contractor may elect to delay the jetting operation until just prior to installing the permanent pavement. This shall not relieve the Contractor from the responsibility of maintaining the temporary surface in accordance with these specifications.

Maintaining Trench Surfaces

All surface settlement of the backfill along trenches located beneath streets, roads, alleys, driveways and parking lots which are subject to traffic shall be kept filled level with or slightly above the original paved surface at all times with compacted aggregate base material until the permanent

pavement is satisfactorily restored. When temporary asphalt pavement is used, depressions and "pot holes" shall be promptly filled with the temporary asphalt material. Special attention shall be given by the Contractor to the timely and proper maintenance, leveling and grading of the surface of all backfilled trenches, especially those subject to traffic and especially following rains. The surface of streets, roads and alleys shall be maintained smooth and free of ruts and water trapping depressions by periodic power blading, scarifying; and/or filling settled areas, ruts, pockets, or holes with compacted aggregate base material or temporary asphalt where used.

As a dust preventive, the Contractor shall apply, at his expense, calcium chloride over the surface of the compacted aggregate base in such amounts and at such times as are necessary to avoid or eliminate dust complaints from nearby residents. In event of any question regarding the existence or nonexistence of a dust nuisance, the Engineer's decision on the matter will govern. The material used shall be Regular Flake Calcium Chloride having a minimum chemical content of Calcium Chloride of seventy-seven percent (77%). Unless otherwise specified or ordered by the Engineer, the rate of application shall be one and one half (1 ½) pounds per square yard of surface covered.

Wherever surface settlement is not important, unless otherwise specified or directed, the backfill shall be neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation. Just prior to the completion of all work under the contract, any surface settlement below original ground surface shall be refilled in a satisfactory manner, and reseeded as specified if required.

Backfill Around Structures

For purposes of this specification, structures shall include but not be limited to footings, foundations, basements, grade beams, vaults, capsules, manholes, ducts, tanks, bridges, inlets, headwalls, anchors, and etc. Items specifically excluded from this definition of "structures" are pipe, conduits and their appurtenances except those listed herein.

The material for backfill around structures shall meet the requirements of Class I, II or III backfill materials, as defined on page WM 3 (1 of 8) under the paragraph entitled "Backfill Materials". Material removed from the project site may be used as long as it meets this criteria. Materials classified as Class IV, clay balls, debris, topsoil, frozen or excessively wet or dry materials, weak soils or muck and other similar detrimental materials will not be put in place as backfill around structures.

All excavations shall be backfilled to the original surface of the ground or such other grade as shown on the plans or directed by the ENGINEER. The backfilling shall be carried along as speedily as possible and as soon as the concrete, mortar and/or other masonry work and pipe joints have sufficient strength to resist the imposed load without damage. All appurtenances and attachments to structure walls shall be made and any wall coatings shall be in place and cured prior to backfilling at that elevation.

Prior to backfilling, all formwork and construction debris will be removed. Any frozen or wet subsoil will be thawed or dried and compacted or removed prior to receiving backfill. During cold seasons, grades receiving backfill will be protected from frost during the work progress.

Begin backfill at the lowest elevation in the excavation. Place backfill in even, level layers. The thickness of the layer shall not exceed 75% of the compaction equipment manufacturer's rating for the equipment used when compacting the type of soil being placed for backfill, i.e. Class I, II and/or III.

Density tests will be made by the contractor, as directed by the Engineer, at no additional cost to the Owner. The tests are to be performed as described below and will be required as necessary to determine that uniform compaction throughout the depth of the lift has been achieved. Where backfill is required on both sides of structure or around the entire structure, backfill and compaction shall be done simultaneously on both sides or around the structure.

The compaction equipment used for compacting backfill around structures shall be submitted for approval of the Engineer. In general, the equipment will be approved for use upon demonstration that it is capable of compacting the soil to the required density without damaging adjacent structures and appurtenances. Tread mounted equipment shall not be considered effective compacting equipment.

The Contractor shall provide, when necessary, equipment and materials to moisten or aerate excessively wet or dry backfill to maintain optimum moisture content (+/- 2%) for the soil type being placed.

Rainfall and/or-groundwater trapped in the excavation during backfill operations shall be pumped out by the Contractor. Excessively wet soil or soil which has eroded into the excavation shall be removed or excavated and recompacted prior to placing additional backfill material.

The in-place density obtained by the backfill operations will be measured by an Engineer approved independent testing laboratory obtained and paid for by the Contractor at no additional cost to the Owner. The percent compaction will be determined by dividing the density measurement by the maximum density for the soil type being tested. The maximum density will be determined by the standard proctor test, ASTM D698. Test reports shall indicate the location and elevation of the test. Density testing shall be made at frequent intervals along the backfill layer, at the surface and at mid-depth as determined by the Engineer. All backfill shall be compacted to at least 95% of maximum density and the top two feet of backfill under areas subject to vehicular traffic shall be compacted to 98% of maximum density.

Openings in structures to receive pipe shall be temporarily plugged or bulkheaded during backfill operations. Backfill shall proceed to an elevation level with the invert of the pipe. The pipe shall then be bedded and backfilled in accordance with the applicable Detailed Specification and Workmanship and Materials Specifications. Backfill of pipe not in areas subject to vehicular traffic shall be with Class I, II or III materials and in areas subject to vehicular traffic with Class I or II materials only.

General Fill Areas

In areas where general site fill material is required and is not addressed in other parts of this section, Class IV material shall be acceptable. For general fill areas, fill materials shall be spread in layers not to exceed 8 inches when in a loose condition and be compacted to the satisfaction of the engineer by grading equipment.

(SECTION WM 4)

RESTORATION OF SURFACES

General

Restoration of surfaces shall include the removal of the existing surface, the disposal of the surplus material and the construction of new surfaces and adjusting all new and existing structures for proper grade prior to paving as indicated on the plans and/or as specified in these Specifications.

Restoration of Paved Surfaces

Restoration

After all excavations within the limits of paved surfaces have been properly backfilled and compacted in accordance with Sections WM 2 and WM 3 of these Specifications, the paved surfaces shall be restored to a condition as good as or better than existed prior to the beginning of the work, in accordance with the following specifications.

State Paved Surfaces: Highways, streets and roads constructed and/or maintained by the Indiana State Highway Department, which are wholly or partially removed, damaged or disturbed by the Contractor's operations shall be restored to a condition as good as or better than existed prior to the beginning of the work. Such restoration shall be performed in accordance with the pertinent specifications and standards of the Indiana State Highway Department, as applicable.

Other Paved Surfaces: Streets, alleys, sidewalks, driveways, curbs and gutters, not constructed or maintained by the State Highway Department, but paved with asphalt, concrete, cinders, crushed stone, waterbound macadam, oil-bound macadam, or heterogenous paving materials, which are wholly or partially removed, damaged, or disturbed by the Contractor's operations, shall be restored with like or better materials, acceptable to the Engineer, to a condition as good as or better than existed prior to the beginning of the work, so that movement of traffic, both vehicular and pedestrian, through the restored way shall be as free, safe and unimpeded as before.

Temporary Surface

Temporary trench surfaces shall be installed and maintained in accordance with section WM 3 Backfill, Fills and Embankments of this specification. This temporary surface shall be maintained by the Contractor until the permanent pavement is placed. Before placing permanent pavement, all or parts of the temporary surface shall be removed, as necessary, and hauled from the site of the work.

Temporary Pavement Replacement

Trench surfaces of highly traveled streets and roads may be designated to receive a temporary pavement replacement of cold mixed bituminous pavement. This temporary pavement shall be of the thickness specified or shown on the plans and shall be surface mixture Class A or B prepared and placed in accordance with Section 406 - Cold Mixed Bituminous Pavement of the latest edition of the Indiana State Highway Department Specifications. Prime and tack coats shall not be required. All temporary pavement shall be maintained by the Contractor to proper grade so as not to impede the safe flow of traffic until the permanent pavement replacement is made.

Permanent Paving

Permanent paved surfaces shall be restored in accordance with the following requirements, unless otherwise set forth in the plans, the Special Provisions or Detailed Specifications; however, in all cases, the methods and materials of restoration shall meet the requirements of the Indiana State Highway Department, as applicable.

Class "B" Concrete Pavement

Existing local streets, roads, alleys, driveways and parking areas consisting of concrete pavement shall be restored according to the following requirements.

Areas subjected to excavation or damage by the Contractor are to be replaced as a whole. Sidewalks to be replaced in complete sections, streets and driveways as complete sections or replaced with sections that coincide with the original pattern, and to the Owner's and/or Engineer's satisfaction.

Prior to placing concrete, the existing edges are to be saw-cut in a neat straight manner, sub-base compacted, wetted down and edges swept clean. The use of flexible joint material is required as needed. All chunks of existing material larger than three by three (3 x 3) inches are to be removed.

Class "B" concrete pavement shall consist of a cast in place, layer of Class A concrete as described in Section WM 5 - Concrete of these specifications with one (1) layer of woven wire fabric (6 x 6 - W1.4 x W1.4) meeting ASTM Designation 497. Except where specified differently in the Detailed Specifications or shown differently on the Plans the concrete layer shall be six (6) inches thick. All rigid concrete pavement work and materials shall meet the latest specifications of the Indiana State Highway Department.

Class "C" Asphalt Pavement

Existing local streets and roads consisting of asphalt paving shall be restored with binder and surface of the thickness specified and as follows:

Areas subject to Class C asphalt pavement replacement shall have the existing edges (those created by cutting prior to excavation) re-cut in a neat straight manner as to remove irregularities and damaged areas. Manholes, service line trenches and existing valve areas are to be boxed out in a neat manner. All cuts shall be parallel or perpendicular to the trench. Curved or diagonal cuts shall not be allowed. All chunks of existing material larger than three by three (3 x 3) inches are to be removed.

The aggregate base course, including the previously placed temporary surface or pavement, shall have the upper portions removed to allow placement of the binder and surface. After the base is cutback, it shall be re-compacted with a ten (10) ton roller or other suitable equipment if approved by the Engineer. Care shall be taken to assure that not less than six (6) inches of compacted aggregate base remains below the permanent pavement.

The binder course(s) shall consist of compacted Hot Asphaltic Concrete, Type A, Size No. 9 as defined by the latest edition of the Indiana State Highway Specifications. Compaction shall be accomplished with suitable smooth wheel rollers. Where multiple binder courses are specified or shown on the plans each course shall be thoroughly compacted before placing the next layer.

Generally, conventional self-propelled rollers of not less than 10 tons gross weight shall be used. The Engineer may allow other specialized rollers for narrow trenches or lighter rollers with vibratory action. The Engineer shall consider alternate equipment only if Contractor requests same in writing and includes technical data on the specific equipment to be considered.

The quantity and thickness of binder courses required shall be as specified or shown in the Detailed Specifications or Plans. In absence of such direction one (1) course shall be required, two (2) inches in thickness.

The surface course shall consist of compacted Hot Asphaltic Concrete Surface Type A, (Size No. 11 or 12) as defined by the latest edition of the Indiana State Highway Specifications and placed in the same manner as described above for binder. The surface thickness shall be as specified or shown in the Detailed Specifications or Plans. In absence of such direction the thickness shall be one (1) inch.

Class "D" Asphalt Pavement

Existing State highways consisting of asphalt paving shall be restored with base and surface of the thickness specified as follows.

Areas subject to Class D asphalt pavement replacement shall have the existing edges (those created by cutting prior to excavation) re-cut in a neat straight manner to remove irregularities and damaged areas. Manholes, service line trenches and existing valve areas are to be boxed out in a neat manner. All cuts shall be parallel or perpendicular to the trench. Curved or diagonal cuts shall not be allowed. All chunks of existing material larger than three (3 x 3) inches are to be removed. Upper portions of the previously installed compacted aggregate base including temporary surface or pavement shall be removed to allow placement of the base and surface. Care shall be taken to assure that not less than six (6) inches of compacted aggregate base remains below the pavement asphalt base.

The base course shall consist of four (4) - three (3) inch separately compacted layers of Bituminous Base (Size No. 4 or 5).

The surface course shall consist of one (1) inch of compacted Hot Asphaltic Concrete Surface (Size No. 11 or 12).

All Hot Asphaltic Concrete Binder and Surfaces Mixtures for Class "D" shall be prepared, placed, compacted, and finished in accordance with latest edition of the Indiana State Highway Department Specifications.

Double Chip and Seal

This work shall consist of two applications of bituminous material, each followed by an application of cover aggregate in accordance with these specifications.

Grade and roll the sub-base prior to application.

The first application shall consist of applying a liquid sealing asphalt at the rate of 0.50 gallons per square yard followed by application of aggregate (Size No. 8 or 9) at the rate of forty (40) pounds per square yard and rolled to seat the stone in the asphalt.

The second application shall consist of applying liquid sealing asphalt at the rate of 0.40 gallons per square yard then chipped with aggregate (Size No. 11) at the rate of twenty (20) pounds per square yard.

All work shall be in accordance with Section 407 of the Indiana State Highway Department Specifications.

Adjustments of Shoulders Necessitated by Resurfacing

The shoulders of the road shall be adjusted to the elevation of the resurfacing with all materials (i.e., earth, sod, gravel, crushed stone, asphalt, etc.) necessary. The transition may be made within a distance of one (1) foot to one and one-half (1 & ½) feet from the edge of paving except in unusual cases where a greater distance is required. Existing driveways shall be primed and wedged from a featheredge to the final height of the resurfaced street paving.

Restoration of Ground Surfaces

All ground surfaces in public Rights of Way, easements and on private property that have been damaged or destroyed by the Contractor's operations shall be restored in accordance with the following specifications. All surplus material, rock, trees, shrubs, concrete pipe, asphalt, crushed stone, etc., not to be used in the Contractor's restoration operations shall be removed from the site and disposed of in an acceptable manner.

Restoration of Grassed Areas with Sod

Where shown on the plans or required by the Detailed Specifications established grassed areas shall be restored with sod containing grasses of comparable quality. Sod shall be placed and rolled so that the final elevations of the area being restored are the same as existed prior to the beginning of construction. Sod shall be pegged where necessary, and shall be watered and cared for to assure its survival.

Restoration of Grassed Areas with Seed and Mulch

Where shown on the Plans and allowed by the Detailed Specifications the Contractor shall seed and mulch in one of the following manners as designated in the Detailed Specifications:

Bluegrass Seeding: The ground shall be loosened approximately three (3) inches deep with a disc or a harrow and fertilized with twenty-five (25) pounds of 10-10-10, or equivalent, and one hundred (100) pounds of agricultural lime per one thousand (1,000) square feet.

The mixture of seed applied shall be as follows:

65% Kentucky Bluegrass
25% Perennial Rye Grass (Lolium Perenne)
10% Red Top (Arrostis Alba)

The seed shall be applied at a rate of five (5) pounds per one thousand (1,000) square feet and shall be well raked or boarded into the soil and mulched with straw of sufficient thickness to hold the seed until it has germinated.

During those times of the year that seeding may be substituted for sodding, as directed or permitted by the Engineer, the seeding shall be as set forth above.

Rye or Fescue Seeding: The ground shall be loosened approximately three (3) inches deep with a disc or harrow; fertilized with twenty-five (25) pounds of 10-10-10, or equivalent, and one hundred (100) pounds of agricultural lime per one thousand (1,000) square feet, sown at a rate of seventy-five (75) pounds per acre with an approved grade of perennial rye or Kentucky No. 31 Fescue grass seed that will provide early growth during the season in which it is planted. The seed shall be well raked or boarded into the soil.

The time for application of the seed and fertilizer shall be at the discretion of the Engineer.

Mulching Material: Unless otherwise permitted by the Engineer, vegetable materials for mulching shall be wheat, oats, barley or rye straw only. All materials shall be reasonably free from weed seeds, foreign material, and other grasses and chaff, and shall contain no Johnson Grass. The straw shall be reasonably bright in color and shall not be musty, moldy, caked, or of otherwise low quality. The straw shall be dry on delivery, and spread evenly where necessary.

Unless otherwise specified, the bituminous material to be used for "tying down" straw mulch shall be a slow setting emulsified asphalt. The material shall be nontoxic to plants.

Mulch net may be used to hold mulch in place until turf is established. The net shall be made of a tightly twisted craft paper yarn, leno woven with a wrap count of one (1) pair of yarns per two (2) inches and a filling count of two (2) per inch. Salvage edges and center shall be reinforced with polyethylene filament. The material shall have a minimum width of forty-five (45) inches.

Clean Up

Before final acceptance of the work, the Contractor shall satisfactorily clean all areas within the limits of his operations including the street surfaces, walks, gutters, fences, lawns, private property and structures, leaving them in as neat, clean and usable condition as originally found. He shall remove all machinery, tools, surplus materials, temporary buildings and other structures from the site of work. He shall also remove all organic matter and materials containing organic matter from all areas and places used by him during construction. All pipes, manholes, inlets, etc., shall be cleared of all scaffolding, sedimentation, debris, rubbish and dirt.

Where the Contractor's operations have resulted in filling existing ditches, clogging existing culverts, damaging existing bridges, ground surfaces, sidewalks, driveways, etc., the Contractor shall re-ditch, clean culverts, repair or replace bridges, ground surfaces, sidewalks, driveways, etc. so as to return them to a condition as good as or better than existed prior to the beginning of his operations.

The Contractor's cleanup operations, which include repair, restoration or replacement of ground surfaces and existing improvements and the removal of rock, shall be performed continuously during the construction operations.

(SECTION WM 7)

SEWER PIPE

Description

The Contractor shall furnish and lay, as required, sewer pipe, together with all bends, branches, or other specials as shown on the plans or specified and, necessary to complete the work, including necessary pieces of sewer pipe for purpose of physical tests. Sewers shall be constructed of the pipe materials as specified.

All sewers to be furnished under this Contract shall conform to specifications of this section. Reference is also made to the following section of these Workmanship and Materials Specifications which are applicable to gravity sewers:

WM 8 - Laying of Sewers

Actual materials furnished for sanitary and/or storm sewer pipes shall be permitted only as indicated in the Detailed Specifications. All references to ASTM specifications shall be to the latest designation.

The following specifications shall apply to sewer pipe and joints together with all required bends, branches, fittings, and other specials required for installation; and to specimens of pipe and materials required for testing.

All sanitary sewer pipe shall be highly resistant to acids and alkalis, and shall be completely resistant to acids generated by the hydrogen sulfide corrosion cycle.

When tests of pipe materials are required by the Engineer, six copies of the test results shall be submitted to the Engineer immediately following the tests. Certificates, original and five copies shall be furnished to the Engineer certifying that all materials meet the designated ASTM Specification in these Workmanship and Materials Specifications.

Pipe Materials

1. Unreinforced Concrete Pipe

All unreinforced concrete sewer pipe furnished under this Contract shall be Class III, unless otherwise specified in the Detailed Specifications. All unreinforced concrete pipe shall conform to ASTM Designation C 14. All unreinforced concrete pipe shall be tested in accordance with ASTM Designation C 497.

2. Reinforced Concrete Pipe (RCP)

Reinforced concrete pipe shall be Reinforced Concrete Culvert, Storm Drain and Sewer Pipe conforming to ASTM Designation C 76. Pipe shall be Wall C, unless otherwise indicated on the plans or in the Detailed Specifications. Class shall be as required by loading conditions, but shall not be less than Class III.

Reinforced concrete pipe shall be tested in accordance with ASTM Designation C 497.

3. Reinforced Concrete Horizontal Elliptical Pipe (RCP-HE)

Reinforced Concrete Horizontal Elliptical Pipe shall conform to the requirements of the latest revision of ASTM Designation C-507, Class III, unless otherwise indicated on the Drawings or in the Detailed Specifications.

Reinforced Concrete Horizontal elliptical pipe shall be tested in accordance with ASTM Designation C-497.

All reinforced concrete horizontal elliptical pipe shall be TYPE "C" WALL when used for sanitary sewer purposes.

4. Vitrified Clay Pipe (VCP)

All vitrified clay pipe and fittings shall be extra strength pipe and conform to ASTM Designation C 700.

All vitrified clay pipe shall be tested in accordance with ASTM Designation C 301.

5. Plastic Truss Pipe (PVC/ABS)

All plastic truss pipe furnished under this Contract shall meet the requirements of ASTM Designation 2680 and ASTM D1784 for a minimum cell classification of 12454B or 12454C or ASTM D1788 for all classification of 2-2-3. The fill material shall be Portland Cement, Perlite Concrete or other inert filler material exhibiting the same degree of performance.

All pipe shall be tested in accordance with the Standard Method of Test for External Loading Properties of Plastic Pipe by Parallel-Plate Loading, ASTM Designation 2412. Pipe stiffness shall be a minimum of 200 psi. All joints shall be gasketed and meet requirements of ASTM D3212 and ASTM F477.

6. Polyvinyl Chloride Pipe (PVC)

All PVC pipe 15-inches or less in diameter furnished under this Contract shall meet the requirements of ASTM Designation D-3034. All PVC pipe greater than 15-inches in diameter shall meet or exceed the requirement of ASTM F-679. For diameters 15-inches or less, the pipe shall have a minimum cell classification of 12454-B and for diameters greater than 15-inches, the pipe shall have a minimum cell classification of 12454-C with all pipe having a minimum tensile strength of 7000 psi as defined in ASTM D-1784.

All PVC pipe shall be tested in accordance with Standard Method of Test for External Loading Properties of Plastic Pipe by Parallel - Plate Loading, ASTM Designation 2412. Minimum pipe stiffness shall be 46 psi.

7. Ribbed Polyvinyl Chloride Pipe (RPVC)

All Ribbed PVC Pipe furnished under this Contract shall conform to ASTM Designation F 794 for sewer pipes 8-inch thru 48-inch in diameter. All 8-inch thru 18-inch pipe supplied under this contract shall have a minimum uniform pipe stiffness of 60 psi. All pipe 21-inch

and larger shall have a minimum uniform pipe stiffness of 46 psi. The minimum cell classification shall be 12454-B as defined by ASTM D-1784.

8. High-Density Polyethylene Pipe (HDPE)

All High - Density Polyethylene Pipe furnished under this contract shall be manufactured from materials meeting the requirements of Type III, Class C, Category 5, Grade P34, as defined in ASTM D-1248, Standard Specifications for Polyethylene Plastics molding and extrusion materials.

Pipe and fittings shall be made from high molecular weight high density polyethylene material meeting the requirements of ASTM D-3350, cell class PE 334433C. All HDPE shall have a minimum pipe stiffness of 46 PSI when measured in complete accordance with ASTM D-2412. The Ring Stiffness Constant (RSC) classification value for pipe between bell and spigot shall comply with the minimum value of 36 lbs/ft.

This pipe shall be installed in accordance with the manufacturer's recommendations for this particular application.

The joints shall be manufactured with Bell and Spigot end construction with a rubber gasket to form a positive seal when assembled in the trench. The rubber gasket material and manufacture shall conform to ASTM F-477.

9. Corrugated Steel Pipe and Pipe Arch (CSP & CSPA)

Corrugated Steel Pipe and Pipe Arch Furnished under the Contract shall be fabricated with Helical Corrugations and a continuous welded seam extending from end to end of each length of pipe. The method of fabrication and materials to be used shall be in accordance and AASHTO specification M-36 for zinc coated (Galvanized) steel sheets. The pipes shall conform to Type 1 for circular sections and Type II for pipe arch sections. The minimum metal thickness for all corrugated steel pipes and pipe arches shall be fourteen (14) gage material unless otherwise shown on the plans or specified in the Detailed Specifications.

All Corrugated Steel Pipe and Pipe Arch shall be fully bituminous coated and one-hundred percent (100%) paved or lined in accordance with AASHTO Specification M-190, Type "D".

Corrugated Steel Pipe and Pipe Arch shall not be used for sanitary sewers.

10. Ductile Iron Pipe

All ductile iron pipe furnished under this Contract for gravity sewers shall conform to the requirements of ANSI A 21.51 or Federal Specification WW-P-421c Type II and shall be Class 2 with push-on-joints.

11. Polyvinylchloride Corrugated Pipe (PVCC)

All corrugated PVC pipe furnished shall conform to ASTM F949 for sewer pipes 6-inches through 18-inches. Minimum cell classification shall be 12454B or 12454C as defined by ASTM D-1784. PVC pipe shall have a minimum pipe stiffness of 50 psi in accordance with testing under ASTM D-2412.

Sewer Pipe Joints

1. Concrete Pipe Joints

Joints for sewer pipe manufactured of reinforced or unreinforced concrete shall be flexible watertight joints conforming to "Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible, Watertight, Rubber Gaskets" (ASTM Designation C 443). Joints shall be made using rubber or rubber-like materials manufactured to fit tongue and groove or bell-and-spigot type concrete pipe. The joint shall be installed in accordance with the manufacturer's recommendations.

2. Clay Pipe Joints

Joints for clay sewer pipe shall be compression- type-joints conforming to "Standard Specifications for Compression Joints for Vitrified Clay Bell-and-Spigot Pipe" ASTM Designation C 425). Joints shall be factory made bell-and-spigot joints. Bells may be of integrally formed fired clay or of epoxy-secured PVC plastic formed and fastened at the factory. Spigot ends shall be furnished with a resilient seating element of plastic, rubber or rubber-like material; the sealing element may be either factory or field-applied.

3. Plastic Pipe Joints

Joints for plastic pipe shall be elastomeric gasket joints in accordance with ASTM Designation D 3212. Gaskets used in the push-on-joints shall conform to ASTM Designation F-477. The pipe manufacturer shall provide "Home Marks" on the uncoupled end of each piece of pipe.

Joint Testing

Sanitary sewer pipe and joints furnished shall meet the following laboratory tests of assembled joints on random samples of each class, size, and type of pipe required for this Project.

All pipe shall be required to withstand a hydrostatic pressure of twenty (20) feet of water (8.6 psi) for two (2) hours while being deflected to the maximum amount recommended by manufacturer. Continuing the hydrostatic pressure, a shear load of one hundred (100) pounds per inch of nominal pipe diameter shall be applied to an unsupported spigot immediately adjacent to joint. During testing period, there shall be no visible leakage at joint.

Assembled joint tests shall be performed by an independent testing laboratory approved by Engineer at the expense of the Contractor. Tests shall be performed on not more than one percent (1%) of total length of pipe of each class, size, and type required for Project, except that at least two (2) specimens shall be used for each test.

Generally, pipe joint tests shall be performed as described in respective ASTM Specifications listed below, except that hydrostatic pressure and time of test shall be modified as above. All types of pipe joints shall be subjected to hydrostatic testing; in addition, vitrified clay, and concrete shall be subjected to the shear loading test.

ASTM specifications covering testing of sewer pipe joints include: "Standard Specification for Compression Joints for Vitrified Clay Bell-and-Spigot Pipe" © 425) for clay sewers; "Standard

Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, Using Flexible, Watertight, Rubber Gaskets" © 443) for concrete sewers; "Standard Specification for ABS Composite Sewer Piping" (D 2680) for ABS Plastic with type SC joint, Standard Specification for ABS Sewer Pipe and Fittings (ASTM Designation D 2751 and ASTM Designation D 3212); and "Standard Specifications for Type PSM PVC Sewer Pipe and Fittings" (D 3034 and D 3212) for PVC plastic with elastomeric gasket joints.

(SECTION WM 8)

LAYING OF SEWERS

General

This Workmanship and Materials section on the Laying of Sewers shall be divided into two (2) classifications - rigid and nonrigid conduit. Pipe materials such as concrete, clay, asbestos-cement, PVC/ABS truss, cast iron and ductile iron pipe are considered rigid conduits. Thermoplastic (PVC) and corrugated metal pipes shall be considered nonrigid or flexible conduits. Flexible pipe material used for pressure sewers shall be installed in accordance with WM-14.

The depths of the existing utilities (gas, water, telephone, etc.) are not shown on the plans. The contractor should anticipate a certain number of vertical grade conflicts between the proposed sewer and the existing utility based on the depth and size of the sewers, the number of utilities shown on the plans and previous experience. The Contractor shall include the time and expense which is typically associated with this type of conflict in his bid including down time, loss of productivity, mobilization and remobilization but not the cost of relocating the existing utility if that is found to be necessary.

Rigid Conduit Installation

All rigid conduit for sewer pipe shall be laid to the lines and grades shown on the plans, unless otherwise directed by the Engineer. All rigid pipe shall be laid in accordance with the details shown on the plans for the First Class Pipe Laying Method. This First Class Pipe Laying Method may be achieved by Class B bedding methods as shown in the ASCE Manual of Practice No. 37, latest edition. Under this Class B bedding Method, the pipe shall be bedded in compacted granular material (Class I or Class II as described in Section WM 3 of these Workmanship and Materials Specifications) placed on a flat trench bottom. The bedding shall have a minimum thickness of one-fourth (1/4) the outside pipe diameter below the pipe and shall extend halfway up the pipe barrel at the sides. All granular bedding material shall be placed in the trench in approximately six (6) inch layers. Compaction shall be accomplished by hand or mechanical tamping or by "walking" the granular material in. From the halfway point on the pipe (Springline) to a point twelve (12) inches above the top of the pipe, backfilling methods A or B or C as described in Section WM 3 of these Workmanship and Materials Specifications shall be used depending on the trench location. In addition, all rigid conduit shall be installed in accordance with "Standard Recommended Practice for Installing Vitrified Clay Sewer Pipe" (ASTM Designation C 12 and ASTM D2321).

The laying of pipe in finished trenches shall be commenced at the lowest point, proceeding upstream, with the spigot ends pointing the direction of flow.

No blocking under pipes will be permitted, except as approved by the Engineer for pipe to be encased in concrete or laid in concrete cradles.

Except as otherwise specified, the excavation work for the sewers shall be performed in accordance with the Workmanship and Materials Specifications for "Excavation."

The practice of blocking pipe up to grade with bedding material, then backfilling under is prohibited. The entire length of the bed section is to be at proper grade before installing pipe.

The supporting strength of the pipe is dependent upon its foundation and trench width. To develop normal strength, the pipe shall have a firm uniform foundation under the entire lower quadrant of the barrel. No weight should be supported by the bell. The maximum trench width as recommended by ASTM at the level of the top of the pipe shall be maintained as narrow as possible, taking into consideration the limitation of the excavation equipment except as may be permitted by the Engineer upon investigation of the soil conditions, laying methods and earth loadings.

All pipes and specials shall be carefully inspected before being laid, and no cracked, broken or defective pipe or special shall be used in the work. All pipe shall be carefully inserted in the bell in such a manner that there will be no unevenness of any kind along the bottom half of the pipes and so that there is a uniform joint space all around.

All pipe that is field cut shall have the homing-marks reestablished, insuring for proper seating depths. Pipes that are field cut shall have the cut ends retapered, by grinding or filing, as close to the original taper provided by the manufacturer as possible. When homing pipe with a spud-bar or other mechanical equipment, other than by hand, place a piece of wood between pipe and tool to prevent damage to bell end-section.

Pipe laid in open cut shall have all trench spaces and voids solidly and completely filled with suitable earth materials from the excavations which shall be thoroughly and solidly rammed into place, unless otherwise specified.

The joints shall be constructed as specified. The interior of the sewer shall, as the work progresses, be cleared of all dirt and superfluous materials of every description. Whenever pipe laying is discontinued, the unfinished end of the sewer shall be protected from displacement and cave-in or other injuries. During the process of the laying, care shall be taken to protect both pipes and joints from disturbance, and the trench shall be kept free from water until the joints shall have set. All surplus mortar or debris shall be promptly and completely removed from the interior of the pipes. On sewers twenty-four (24) inches in diameter and less, a disc mold or swab attached to a rod sufficiently long to pass two (2) joints from the end of the pipe last laid, shall be continuously worked through as the laying of the pipe proceeds.

The ends of the pipes shall be protected to prevent the entrance of dirt or other foreign substances. Such protection shall be placed at night or whenever pipe laying is stopped for any reason. Suitable plugs designed for use with the pipe material shall be provided and properly secured and used to cap all slants and branches. Pipe end protection and devices shall be included in the prices bid per linear foot of sewer.

Flexible Conduit Installation

Plastic sewer pipe (PVC) and other flexible pipe shall be carefully installed in accordance with the above specification for Rigid Conduit Installation, except where the following paragraphs modify those specifications.

Flexible conduit for sewer pipe shall be installed in accordance with "Underground installation of Flexible Thermoplastic Sewer Pipe" ASTM Designation C 2321.

The Contractor shall take special precautions when homing PVC pipe not to over-seat past the home-marks. The pipe installation must include adequate bedding to hold its proper placement, prior to installing the next section.

The Contractor shall use caution when stringing thermoplastic pipe. Excessive spans, in sunlight, will cause bowing damage; and said damaged spans will be rejected.

In addition to the construction and testing procedures outlined in other sections of these specifications, the Contractor shall be required to install the flexible pipe in such a manner so that the diameter deflection of the pipe shall not exceed five percent (5%) when tested in accordance with the Final Acceptance Test. Bedding materials surrounding the pipe shall be compacted to the densities required to meet the five percent (5%) maximum deflection requirement. The area requiring compaction shall be included in the bed and side fill material and also the material placed above the pipe for a distance of twelve (12) inches over the top of the pipe.

The First Class Pipe Laying Method for Flexible conduit may be achieved by Class B Bedding Methods as shown in the ASCE Manual of Practice No. 37, latest edition. Under this class B Bedding Method, the pipe shall be bedded in compacted granular material (Class I or II as described in Section WM 3 of these Workmanship and Material Specifications) placed on a flat trench bottom. The bedding shall have a minimum thickness of one-fourth (1/4) the outside pipe diameter below the pipe and shall extend twelve (12) inches above the top of the pipe level and full width of the trench. All granular bedding material shall be placed in the trench in approximately six (6) inch layers.

Compaction shall be accomplished by hand or Mechanical Tamping or by "Walking" the granular material in for Class I materials only. When Class II materials are used compaction shall be accomplished by hand or mechanical tamping only to a minimum eighty-five percent (85%) Standard Proctor Density. Backfill from a point twelve (12) inches above the top of the pipe to the trench surface shall be in accordance with "backfilling Methods A or B or C" as described in Section WM 3 of these Workmanship and Materials Specifications depending on the trench location.

Plastic pipe shall not be blocked, except where the plans or specifications call for concrete encasement or concrete cradles for the pipe. Blocks shall be encased in concrete also, or removed. Where plastic pipe is to be installed below maximum ground water table, adequate weights shall be provided to prevent flotation of the pipe.

Pipe and fittings shall be carefully inspected before being installed. Cracked, broken or otherwise defective pipe, shall not be used.

Leakage Testing

General

All sewers shall be tested for infiltration and exfiltration as specified. The Contractor shall furnish written reports of all test results to the Engineer.

Contractor shall furnish all labor, materials and equipment required for making tests, with no extra compensation over and above contract prices for sewers. Tests shall be made at times selected by the Engineer. Sections of sewers shall be isolated and measurements of infiltration and exfiltration shall be made by approved means. The Engineer must be present during all final tests.

Sewers whose crowns are below ground water level at time of testing shall be tested for infiltration. Where crown of pipe is above ground water level, sewer shall be tested for exfiltration. If ground water level varies during period of construction, sewers may be tested for both. Spans are not to be tested for Final Acceptance until complete.

Immediately preceding all leakage tests (exfiltration, infiltration and air) the sewer to be tested shall be cleaned by flushing a ball through the pipe. The Contractor shall furnish an inflatable rubber ball of a size that will inflate to fit snugly into the pipe to be tested. The ball may, at the option of the Contractor, be used without a tag line; or a rope or cord may be fastened to the ball to enable the Contractor to know and control its position at all times. The ball shall be placed in the last cleanout or manhole on the pipe to be cleaned, and water shall be introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris, or a damaged pipe shall stop the ball, the Contractor shall remove the obstruction.

Infiltration Tests

Sewers which are constructed with ground water level above Crown of pipe shall be tested for infiltration after sewers have been installed and backfilling has been substantially completed. A convenient section of sewer shall be selected between manholes. The upper section of sewer shall be plugged watertight with temporary bulkhead. A suitable measuring device shall be installed at the lower end.

The amount of water flowing through the outlet shall be measured periodically through the next twenty-four (24) hours. The flow thus measured shall then be converted by gallons per day per inch diameter per mile and compared with the maximum allowable limit of two hundred (200) gpd/in./mile.

Exfiltration Tests

A section or sections of sewer between manholes shall be isolated by water tight bulkheading. Isolated sections shall then be filled with water to a level three (3) feet above the crown of the pipe at the upstream end of the section; water level at the downstream end of the section shall not be more than six (6) feet above the crown of the pipe. After allowing the system to stabilize overnight, the section shall be refilled with water to the original level. After one (1) hour more, the volume of water lost in the section shall be determined by measuring the drop in the water level.

Allowable Leakage

Infiltration or exfiltration of any given segment of sewer pipe shall not be permitted to exceed a rate of two hundred (200) gallons per twenty-four (24) hours per mile of sewer per inch of pipe diameter (0.158 gph/in./100 ft.).

Low Pressure Air Testing

For pipes installed with the pipe crown above the ground water level, air pressure testing may be used in lieu of the exfiltration test. Low pressure air testing is used to determine the existence of pipe leaks; however, it does not indicate water leakage limits.

Prior to the low pressure air testing, all wyes, tees, or end of side sewer stubs shall be plugged with flexible-joint caps, or acceptable alternate, securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable, and their removal shall provide a socket suitable for making a flexible-jointed lateral connection or extension.

All plugs shall be securely braced to prevent possible blowout due to internal air pressure. One plug shall have an inlet tap, or other provision for connecting a hose to a portable air supply source. Air hose shall be connected to the inlet tap and a portable air supply source.

Air equipment shall consist of all necessary valves and pressure gages to control rate of air flow into the test section and to enable monitoring of air pressure within the test section. Testing apparatus shall also be equipped with pressure relief device to prevent the possibility of loading test section with full capacity of compressor.

Air shall be slowly added to test section until pressure inside pipe is raised to 4.0 psig. After a pressure of 4.0 psig is obtained, air supply shall be regulated such that pressure is maintained between 3.5 and 4.0 psig for a period of two (2) minutes, to allow air temperature to stabilize in equilibrium with temperature of pipe walls. Pressure will normally drop slightly until equilibrium is obtained. During this period, all plugs shall be checked with soap solution to detect any plug leak.

After this two (2) minute air stabilization period, air supply shall be disconnected and test pressure allowed to decrease. Time required for test pressure to drop from 3.5 psig to 2.5 psig is determined by means of stop watch, and this time interval is then compared with required time to determine if rate of air loss is within the allowable limit. Required time to arrive at the allowable air loss is calculated by means of following formula:

$$T = \frac{0.0850 DK}{Q}$$

Where:	T	=	Time in seconds
	K	=	.000419 DL but not less than 1.0
	Q	=	Rate of loss (=0.003 cfm/sq. ft. of internal surface)
	D	=	Diameter of pipe in inches
	L	=	Length of pipe tested in feet

Upon completion of test, the bleeder valve shall be opened and all air allowed to escape. Plugs shall not be removed until all air pressure in test section has been released. Also, no one shall be allowed in trench or manhole while test is being conducted.

Pipes larger than thirty (30) inch diameter shall be tested in smaller segments. Length of segments shall be such as to produce a total allowable air leakage of only two (2) cfm when computed on basis of 0.003 cfm/sq. ft. of internal pipe surface.

All pipe lines forty-two (42) inch diameter and over shall be tested one joint at a time with joint testing apparatus. Joint shall be isolated with an expanding shield equipped with gaskets which fit tightly against pipe walls on each side of joint to be tested. Allowable leakage for such a test is equal to that which would occur on the basis of allowable leakage for one length of pipe.

If measured time interval for the pressure to drop from 3.5 psig to 2.5 psig is less than the required time as calculated, sewer section shall be deemed to have failed test. Contractor shall then proceed to repair pipe at his cost as necessary until the sewer section passes the test. All testing shall be conducted in presence of Engineer or his representative (inspector).

Excessive Leakage

If infiltration or exfiltration rate of sewer exceeds maximum rate specified, contractor shall make all necessary repairs to reduce leakage below the allowable. Such repairs shall be made at Contractor's expense. Under no circumstances will grouting be considered an acceptable means of repair. When repairs have been completed, but not more than thirty (30) days after first test, sewer section shall be subjected to a second leakage test as specified above.

If the second test should again indicate leakage in excess of the allowable amount, the Contractor shall, at his own expense, provide complete internal inspection of entire section in question, by means of videotape recording of television inspection or by color photography with exposures every two (2) to four (4) feet along the sewer. Contractor shall employ an independent sewer testing service to inspect pipe. Inspection service shall prepare a written report and shall review videotape or films with Engineer, Contractor, and Owner's representative. Contractor shall then submit a written plan for correction of leakage. Contractor, Owner, and Engineer shall meet as necessary to develop actual program for inspection and repair. Contractor shall not proceed to repair line until he receives written authorization to proceed from Owner or his representative. All inspections, reports, repair, replacement, and compensation for additional professional and administrative expense shall be paid by the Contractor.

Deflection Testing of Installed Flexible Plastic Pipe

Final Acceptance Test

Prior to the final deflection test, the Engineer may, at his option, order the lamping of certain or all sections. Lamping must show a "full moon" and no excessive puddling effects in the span.

The main line shall be flushed prior to the vertical ring deflection tests. The vertical ring deflection tests shall not be performed prior to successful completion of leakage testing requirements.

All main line PVC and PVC/ABS Truss sewers eight (8) inch in diameter and greater shall be measured for vertical ring deflection at least thirty (30) days after installation, but no later than thirty (30) days prior to final acceptance of the project. Maximum ring deflection of the pipeline under load shall be limited to five percent (5%) of the vertical internal pipe diameter. All pipe exceeding this deflection shall be considered to have reached the limit of this serviceability and shall be relaid or replaced by the Contractor at no additional cost to the Owner.

The cost of all deflection testing shall be borne by the Contractor and shall be accomplished by using a deflectometer, which will produce a continuous record of pipe deflection, or by pulling a mandrel, sphere, or pin-type go/no-go device through the pipeline. The diameter of the go/no-go device shall be ninety-five percent (95%) of the undeflected inside diameter of the flexible pipe. The mandrell shall be pulled through the sewers by one man, by hand and specifically without the aid of mechanical devices.

(SECTION WM 20)

SMALL NONMETALLIC PIPE, FITTINGS AND VALVES

Description

Nonmetallic pipe, fittings and valves shall be of the trade name as noted on the plans or set forth under the Detailed Specifications. Unless otherwise specified, the pipe and fittings according to trade name shall comply with the following requirements:

- (a) PVC pipe 1½" diameter and less shall be a rigid polyvinyl chloride pipe which is made in accordance with the latest ASTM Specifications D 1785 and D 1784 for Type I, Grade 1, maximum chemical resistance. Unless otherwise specified, the pipe shall be made to Standard Thermoplastic Pipe Dimension Ratio (SDR) Class 26 for continuous pressure rating of 160 psi for water at 73.4 degrees F. The pipe shall bear the seal of approval of the National Sanitation Foundation (NSF). Pipe shall be supplied either plain-ended or with a coupling attached at one end of each full length of pipe.

Fittings shall be of the socket type unless otherwise shown or specified or required to make connections to metal pipe, equipment, etc. The fittings shall be purchased from the pipe manufacturer and shall be of same material, construction and design at least equal to the adjacent pipe.

Pipe and fittings shall be jointed with a solvent cement consisting of a viscous, brushable solution of polyvinyl chloride in suitable active solvents. The cement shall be purchased from the pipe manufacturer and used according to the manufacturer's instructions and shall produce a joint of sufficient strength to permit normal installation handling within five (5) minutes after jointing, when exercising reasonable care.

Where threaded joints are required, the PVC pipe to be threaded shall be Schedule 120. The dies shall be sharp and in good condition to assure a clean and smooth threading operation from start to finish. Suitable wrapping shall be used as a joint sealer for all threaded joints.

Long straight runs of exposed PVC pipe shall be provided with expansion joints to compensate for changes in length due to thermal expansion and contraction.

Valves used in PVC pipe lines shall be made of PVC Type I (unplasticized polyvinyl chloride) designed for not less than 150 psi working pressure at seventy degrees Fahrenheit (70°F).

- (b) Fibercast pipe shall be a rigid centrifugally cast thermoset epoxy resin reinforced pipe with multiple layers of seamless braided glass fiber sleeving. The pipe shall be standard "Line Pipe" made for maximum operating temperature of two hundred twenty degrees Fahrenheit (220°F). Joints, unless otherwise specified, for pipe and fittings, may be made by threading or cementing. Fittings shall be of same composition as the pipe. Valves shall be made of nonmetallic material as approved by the Engineer.

Erection and Supports

The piping shall be installed and supported in accordance with the applicable Workmanship and Materials Specifications for "Small Metal Pipe and Fittings", WM 19, under the headings: "Erection" and "Pipe Supports for Interior Piping". Flanged joints in lieu of unions may be used to permit ready breaking of joints for future inspection and maintenance. All joints shall be made in accordance with the instructions and/or recommendations of the manufacturers.

The spacing of supports shall be such as to avoid any deflection in the pipe under operating load. Pipe sleeves shall be provided as specified under the Workmanship and Materials Specifications for "Small Metal Pipe and Fittings", WM 19. The manufacturer shall be consulted for recommendations as to proper support spacing and the necessity for expansion joints.

Testing

All nonmetallic pipe shall be tested for watertightness as specified hereinafter under the Workmanship and Materials Specifications heading "Hydrostatic Tests", WM 15, if the pipe line is to be used for conveying a gas, then the line shall be tested by an approved method or procedure which will prove the joints to be gas tight under actual service conditions.

Installation Below Ground

The installation of nonmetallic pipe below ground shall be performed in accordance with the applicable Workmanship and Materials Specifications for "Cast & Ductile Iron Pipe Laying", WM 12, and "Excavation", WM 2, and as recommended by the pipe manufacturer.

(SECTION WM 21.1)

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work under this Section consists of providing all labor, materials and equipment necessary or required for the complete fabrication and erection of all structural steel as detailed on the Structural Drawings and as specified herein. The work includes furnishing and installing the non-shrink grout beneath the structural steel.

- B. Related work specified elsewhere:

- | | |
|---|----------------|
| 1. Steel Joist | Section WM21.2 |
| 2. Steel Roof Deck | Section WM21.3 |
| 3. Miscellaneous and Metal and Aluminum | Section WM22 |
| 4. Painting | Section WM32 |

Loose Lintels are furnished under Section WM22, Miscellaneous Metals.

- C. Work furnished but not installed: Anchor bolts and other embedded connection components.

1.02 QUALITY ASSURANCE

- A. The latest editions of the following standard specifications shall govern the fabrication and erection of the structural steel, except as modified by the design drawings or this specification:

1. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings".
2. AISC: Code of Standard Practice for Steel Buildings and Bridges", except that Section 4.2.1 is specifically excluded.
3. AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
4. AWS "Structural Welding Code D1.1".
5. Steel Structures Painting Council Specifications SSPC.

- B. All welders in both shop and field shall be certified under AWS "Standard Qualification Procedure" for the type or types of welding being performed and shall have been continuously engaged in such welding.

- C. Fabricator and erector shall have continuous business operation for at least 5 years and by evidence of past projects indicate capability of conducting work of a similar nature; have sufficient well maintained equipment to perform the work; maintain an adequate stockpile of materials; qualified labor to fabricate or erect without delay the materials required for this project.

1.03 SUBMITTALS

A. Shop Drawings:

1. Shop Drawings shall be submitted to the Engineer for review. Shop Drawings shall include erection plans and framing elevations, all shop and erection details including copes, connections, threaded fasteners, and welds. No fabrication shall begin until shop drawings have been reviewed.
2. Provide setting drawings, templates and directions for installation of anchor bolts and other devices.

B. Certifications:

1. Provide certification for all welders used in field and shop work.

C. Test Reports:

1. Submit all test reports regarding welding, bolting, and headed studs per Section 3.03.

1.04 PRODUCT HANDLING

- A. Exercise care in handling, storing and erection of structural steel to avoid damage to pieces, welds, joints and paint. Secure pieces against displacement in transit.
- B. Structural steel members which are stored at the job site shall be stored above ground on platforms, skids or other supports. Protect with weatherproof cover held in place.
- C. Clean members which have become soiled before erecting.
- D. Anchor bolts and other anchorage devices which are embedded in cast-in-place concrete shall be delivered to the project site in time to be installed before the start of concrete operations.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel Shapes, Bars and Plates: ASTM A36 unless noted otherwise on the Structural Drawings. High strength steel is designated on the Structural Drawings by using the yield point strength parenthetically as a suffix, thus (50), high strength steel shall conform to the requirements of ASTM A572.
- B. Structural steel tubing: ASTM A500, Grade B, $F_y = 46$ ksi.
- C. Structural steel pipe: ASTM A53, Type E or S, Grade B, $F_y = 35$ ksi or ASTM A501, $F_y = 36$ ksi.
- D. Connection bolts: ASTM A325N (bearing bolts).
- E. Anchor bolts: ASTM A36.

F. Drilled-in anchors (expansion bolts): KWIK-Bolt stud anchor by Hilti Fastening Systems (or approved equal).

G. Welding rods: AWS E70XX for A36 and Grade 50 steel.

H. Headed studs (used as anchor studs or as shear connectors): ASTM A108.

KSM Fastening Systems, Omark Industries
Nelson Stud Welding, TRW Nelson Division
Blue Arc Welding Studs, Erico Products

I. Deformed bar anchors: ASTM A496.

KSM Fastening Systems, Omark Industries
Nelson Stud Welding, TRW Nelson Division

The use of manually welded anchors, rods, bars, straps, or reinforcing bars is not acceptable as a substitute for headed studs or deformed bar anchors.

J. Malleable Iron Wedge Inserts: Hohman-Barnard (or approved equal).

K. Grout: non-metallic, non-shrink, high-strength grout (minimum 5000 psi compressive strength at 28 days).

Five Star
Kemset
Masterflow 713
Quikrete

L. Shop paint: Per Section WM21.1- 2.03.

2.02 FABRICATION

A. Fabricate structural steel in accordance with the AISC "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings" with the modifications and additional requirements specified in this Section.

B. Shop connections shall be welded or bolted with A325 bolts.

C. Use only low hydrogen electric arc electrodes.

Manual welding shall be accomplished with shielded arc electrodes of E70XX series or the strength equivalent of flux cored arc weld. Submerged arc process welding shall be grade SAW-2.

D. Connections:

1. Unless otherwise noted, beam connections shall be simple connections.
2. The steel supplier shall design the connections for at least the reactions indicated on the framing plans, but never less than 50% of the total allowable uniform load on the span.

3. Connection angles shall be 5/16" in thickness (Minimum).
 4. Minimum connection strength shall not be less than that of two 3/4" diameter A325 bolts.
 5. Beam connections shall consist of double web angles unless detailed otherwise on the drawings.
- E. Welds shall be tested as outlined in Section 3.03. The correction of faulty welds shall be in accordance with AWS "Structural Welding Code D1.1".
- F. Steel members of different grades but of the same size and length shall be marked and detailed to prevent misplacement during erection. Varying connection gages between grades of steel is an acceptable means of prevention.

2.03 SHOP PAINTING

- A. Shop paint all structural steel except the following:
1. Contact surfaces in connections using high strength friction bolts,
 2. Surfaces to be field welded,
 3. Structural steel that will receive sprayed-on fireproofing,
 4. Steel encased in concrete,
 5. Embedded steel items (surfaces in contact with concrete),
 6. The top surface of the top flange for all composite beams,
 7. Crane rails.
- B. Shop Primer:
1. Material: 37-77 Tnemec Primer or as specified in WM-32
 2. Volume solids: 55.0 ± minimum
 3. Shop primer shall be compatible with the specified finish paint.
- C. Surface Preparation:
1. SSPC - SP6 Commercial Blast Cleaning
- D. Application:
1. Structural steel shall receive one coat of shop paint except surfaces inaccessible after assembly shall receive a second coat.
 2. Dry film thickness: 2.0 mils minimum.
 3. Follow coating manufacturer's printed directions.

PART 3 - EXECUTION

3.01 ERECTION

- A. Erect in accordance with the AISC "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings".

- B. Field connections shall be made using A325 high strength bolts, bearing type, except where welded connections are called for on the Drawings.
- C. Bolt Tightening:
1. High Strength Bolts shall be "friction" type fasteners when used in the following connections:
 - a. Connections subjected to loosening.
 - b. Connections subject to fatigue due to vibrations.
 - c. Connections subject to stress reversals.
 - d. Wind bracing connections.
 - e. Fasteners in oversized, short or long slotted holes."Friction" type fasteners shall be tensioned in accordance with Table 3 of the "Specification for Structural Joints using ASTM A325 or A490 Bolts". The contact surfaces in a "friction" type connection shall be left unpainted as noted in section 2.03, A, 1.
 2. High Strength bolts shall be designed as "bearing" type fasteners and tensioned in accordance with Table 3 of the "Specification for Structural Joints using ASTM A325 or A490 Bolts" when used in the following connections.
 - a. Connections subject to tension loads.
 - b. Column splices in structures over 100 feet in height.
 - c. Beam to Column connections in structures over 125 feet in height.
 3. High strength bolts that are not covered by sections 3.01, C, 1 & 2 shall be "bearing" type fasteners. These fasteners need only be tighten to a "snug-tight" condition. "Snug-tight" shall be as defined in the "Specification for Structural Joints using ASTM A325 or A490 Bolts".
 4. High strength bolts described by sections 3.01, C, 1 & 2 may be tightened by any method found acceptable by the "Specification for Structural Joints using ASTM A325 or A490 Bolts" unless otherwise noted on the drawings.
- D. Set all structural steel accurately to lines and grades. Connect temporarily with sufficient high strength bolts to insure complete safety of the structure until permanent connections are made. Erection tolerances shall be in accordance with the AISC Code of Standard Practice.
- E. Provide temporary guy lines, bracing, and shoring as required, to maintain stability and alignment until the entire system (including metal deck erection) is erected, permanently connected, braced and set.
- F. Any and all misfits shall be reported to the Engineer for resolution. Burning of new or unfair holes or cutting with a torch will not be permitted without the approval of the Engineer. Reamers, twist drills and saws shall be employed where burning is prohibited.
- G. Any member that has assumed a bend or buckle in its final position due to forced fit shall have one or both ends and any intermediate connections unbolted and re-drilled or reamed to relieve such bowing to the satisfaction of the Engineer.
- H. No piece that has been bent, broken, twisted or otherwise damaged shall be incorporated into the work. Such pieces shall be repaired or corrected on the ground to the satisfaction of the Engineer or replaced with a new piece. Failure to observe this will be cause for rejection of the piece in place.

- I. Prior to the erection of any steel, the Contractor shall verify the location, elevation and plumbness of all anchor bolts and concrete surfaces. The Contractor shall report immediately to the Engineer in writing any condition which he finds unacceptable or that would prevent erection of the structural steel within AISC tolerance for plumbness and elevation. The Contractor shall be responsible for all corrections, and all corrections shall be made in a manner acceptable to the Engineer.
- J. The erector shall acquaint himself with all conditions at the site which can affect his methods and sequence of operations. Abide by Owner's regulations concerning traffic, parking and construction material delivery.
- K. **FIELD TOUCH-UP BY STEEL ERECTOR:** Field bolts, field welds and abrasions to the shop coat shall be repaired and painted by the structural steel erector using the same paint and care as for shop coat. All such surfaces shall be washed with a suitable degreasing solvent. This contractor shall also remove any and all accumulations of mud, clay, rust, scale, grease, etc. that have been acquired, for any reason, during shipment, storage and erection and the shop coat restored to its original condition.
- L. Sub base (levelling) plates under column base plates will not be permitted.
- M. Install headed studs using manufacturer approved equipment in accordance with the manufacturer's instructions.
- N. Furnish all anchor bolts for anchorage of structural steel at an advance date for incorporation into the concrete foundation by others. Provide heavy hex nuts and washers for each bolt. Anchor bolts shall not be installed until shop drawings have been reviewed.
- O. Observe all federal, state and local laws and area trade rules in the erection and handling of structural steel.

3.02 CLEANING UP

- A. Upon completion of erection, promptly remove all tools, equipment and rubbish caused by or resulting from the erection work.

3.03 TESTING

- A. All testing shall be by a testing agency approved by the Engineer, performed by registered/qualified technicians. The Contractor will employ the testing agency.
- B. Test shop and field welds as indicated below:
 - 1. All complete penetration welds shall be tested for 100% of the total weld length using ultrasonic testing apparatus.
 - 2. All partial penetration welds shall be tested for 50% of the total weld length using the magnetic particle method.
 - 3. 20% of all fillet welds shall be tested using the magnetic particle method.
 - 4. All welds shall be visually inspected.

- C. Inspect and test bolted connections; (see Section WM21.1, 3.01C). A minimum of 10 per cent of the bolts (and no less than 2 bolts in each connection) that are tightened per paragraph 3.01C, 2 shall be tested.
- D. Inspect and test headed anchor studs and shear connector studs in accordance with the provisions for quality control of shear connectors, "Structural Welding Code", AWS D1.1.
- E. Test reports shall be prepared by the testing agency giving the following:
 - 1. The type and location of test conducted.
 - 2. The test results.
 - 3. Interpretation of the test results stating whether they comply with the Specification requirements.
 - 4. Procedure taken if the test results are not acceptable.
 - 5. Test results of re-tests after corrective measures have been completed. The cost of all re-testing of faulty welds shall be borne by the Contractor.

(SECTION WM 22)

MISCELLANEOUS METAL AND ALUMINUM

Description

Miscellaneous metal and aluminum includes all weir plates, stop plates, pipe supports, anchors, steel lintels, steel angle sills, iron castings, access panels, etc., and all welding required for fabrication and erection; all as indicated on the plans and as specified to be furnished for the complete construction of the work under this contract. Items such as stiffeners, supports and pipes or other equipment, fasteners loose angles or any other metal items required and not separately specified in other sections of these specifications shall be supplied and installed by the Contractor. The Contractor will be responsible for thoroughly studying the plans for varying conditions involved and materials required.

(a) **General**

Standards - Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the contractor, in such cases, may at his option use any article, device, project, material, fixture, forms or type of construction which in the judgment of the Engineer expressed in writing is equal to that specified.

(b) **Shop Drawings**

The Contractor shall submit for approval, shop drawings in accordance with the provisions, Shop Drawings, of the General Conditions, of all Miscellaneous Metal work included in this contract. The drawings shall show the design, location and all necessary details of such work.

(c) **Materials**

Cast Iron shall be tough, close grain, gray iron of uniform physical character.

Structural Steel shapes and plates shall fulfill the requirements of ASTM's most recent specification.

Bar Steel shall be hot rolled steel bars produced in accordance with good mill practice for general commercial use and shall be bessemer or open hearth grade.

(d) **Workmanship**

General

Miscellaneous metal work shall be fabricated and erected in a thorough and workmanlike manner by mechanics skilled in their line of work. All exposed joints shall be close fitting and all bolts, screws, etc. where exposed shall be cut off flush with nuts or other adjacent metal. The contractor shall do all drilling and cutting required for installation of

Miscellaneous Metal Work, except where such drilling and cutting are definitely specified in other sections of these specifications.

Steel and Wrought Iron shall be well formed to shape and size, with sharp lines and angles. Shearing and punching shall leave clean, true lines and surfaces. Weld or rivet permanent connections. Do not use screws or bolts where they can be avoided; where used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening. Curved work shall be evenly sprung.

Castings shall be sound and free from warp, holes and other defects that impair their strength or appearance. Exposed surfaces shall have a smooth finish and sharp, well defined lines and arises. Machined joints, where required, shall be milled to a close fit. Provide necessary rabbets, lugs and brackets so that work can be assembled in a neat and substantial manner.

Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to weather shall be formed to exclude water. Provide holes and connections for work to be built into adjoining construction.

Anchors - Miscellaneous metal work to be built in with masonry shall be of a form required for anchorage or shall be provided with suitable anchors, expansion shields, etc., as shown on the plans, or as specified.

Joints

Unless otherwise shown, or specified, all joints shall be of such character and so assembled that they will be as strong and rigid as the adjoining section. Exposed joints, where specified, shall be welded their entire length and other work shall be continuously welded or spot welded as required. All welded face joints shall be dressed flush and smooth.

Threaded Connections shall be made up tightly so that the threads will be entirely concealed by fittings. Abutting bars shall be shouldered and beaded, doweled and pinned. Except as otherwise shown, specified or approved, all shop assembled connections shall be welded or riveted; and rivet, bolts or machine screws may be used for field connections.

Rivet, Bolt and Screw Heads - Miscellaneous metal work shall be cut, punched drilled and tapped as required for the attachment of other work where shown on approval of shop drawings.

(e) Installation

General - Work under this Division shall be installed in conformity with approved shop drawings and shall be securely fastened in place. Doors shall be hung and have all hardware attached.

Built-In Work - Work to be built in with masonry shall be furnished in ample time and shall be set and secured in place.

Attached Work - Except where otherwise specified for a particular item of work, or where the work is required to be built in, miscellaneous metal shall be fastened to masonry with expansion or toggle bolts. Fastening to wood plugs in masonry will not be permitted. For attachment to concrete, a self-drilling concrete anchor shall be used. Screws shall be threaded all the way to the head of the screw. Unless otherwise specified all fastening devices shall be suitable type of Ackerman-Johnson Co., Hohmann-Barnard, Inc., Heckman Building Products or equal.

(f) Structural Steel Items

All items of miscellaneous structural steel such as loose lintels, clip angles, channel frames, not attached to the structural steel frame shall be furnished under this Section. Lintels to be sixteen (16) inches longer than span.

(g) Structural Channel Frames

Furnish and erect at locations shown channel door jambs with anchors for jambs as shown. Bottom of jambs to set one (1) inch below floor level. Weld bar stop of size shown to web of channel. Arc welds ground smooth.

(h) Iron Castings

Iron castings shall include all cast iron frames and covers for manholes or at other locations as shown, manhole steps, stop plank guide grooves and any other castings as shown on plans or specified shall be tough, close grained, gray iron, free from blowholes, shrinkage, and cold shunts. They shall conform to the latest standard of the American Society for Testing Materials, Designation A 48-70.

(i) Painting

Before shipment from shop, all miscellaneous metalwork, except galvanized and nonferrous metal, or work specified to be factory finished, shall be thoroughly cleaned of all foreign matter, rusts, scale, dirt and the like, followed by a shop coat. Parts inaccessible after assembly to receive second coat. This painting is in addition to the other painting specified.

All prime or shop coats shall be applied in accordance with Section 32 of the Workmanship and Materials or as noted in other Sections of the Detailed Specifications.

Wherever dissimilar metals make contact with each other, each surface shall receive a coat of liquid neoprene, plus one (1) coat of bitumastic paint. Allow full drying between coats and before installation. Aluminum surfaces in contact with masonry, steel or other metals shall be back coated as specified above.

Wrought Iron

Rolled wrought iron structural shapes, sections and bars shall conform to the ASTM Standard Specifications, Designation A 207. Wrought iron plates shall conform to the ASTM Specification for "Wrought Iron Plates", Designation A 42.

Aluminum

Aluminum weir plates and stop plates shall be fabricated of structural grade aluminum alloy. Aluminum stop plate grooves shall be fabricated of extruded aluminum alloy. The aluminum alloy shall be equal to or better than 60601-T6. Aluminum stop plates and grooves shall be equal to those made by Neenah Foundry Company, Washington Aluminum Company, Inc., or equal.

The gate plates shall be fabricated of one fourth (1/4) inch aluminum sheets and fitted with suitable lift handles of a similar aluminum material. All fastenings and attachments shall be made by welding. The stop plate grooves shall be kept free of concrete and once installed, the stop plates shall slide freely in the grooves without binding.

(SECTION WM 29)

ROADWAYS & PARKING AREAS

Description

New roadway construction shall be performed in accordance with this Specification (Section WM 29). Existing roadway repair and/or rehabilitation shall be performed in accordance with Section WM 4 (Restoration of Surfaces).

Subgrade

The subgrade of the roadways and parking areas shall be shaped either by cutting or filling as the plans may show or as directed by the Engineer. The area between the lines shown on the plans or necessary for construction shall be cleared of all brush, logs or other perishable material. During the construction of all embankments the subgrade shall be formed and maintained in such a manner that the surface water will readily flow off the embankment. The subgrade shall be brought to the correct grade on cuts and to approximate grade on fills with the proper allowance for settlement and shall then be allowed to settle. The subgrade shall be brought to the true shape and grade before the surfacing is placed.

The work shall include all necessary earth excavation, grading, and making of embankments and fills which shall be performed in accordance with the applicable Workmanship and Materials Specifications.

Gravel or Crushed Stone Roadway

The gravel or crushed stone roadway shall consist of a surface course laid on the prepared subgrade. The surface course shall be composed of run of the bank gravel, run of the crusher stone, crushed or uncrushed sand and gravel, or a uniformly blended mixture or combination of any of these materials. The materials shall be reasonably well graded from coarse to fine, generally within the following limits, unless otherwise specified or approved by the Engineer.

<u>Sieve Designation</u> <u>Square Openings</u>	<u>Passing</u>	<u>Percent Retained</u> <u>Retained</u>
1 1/2"	100	0
1"	80-100	0-20
3/4"	70-90	10-30
1/2"	55-80	20-45
No. 4	35-60	40-65
No. 8	25-50	50-75
No. 30	15-30	70-85
No. 200	5-10	90-95

The surface course material shall be deposited and spread uniformly upon the prepared subgrade, in a single layer eight (8) inches in thickness measured before compacting. The material shall be free of lumps of clay and shall be of uniform mixture and density when placed. Portions of the layer in which the aggregates become segregated in spreading shall be removed and replaced with

satisfactory material. Material shall not contain free water or frost, and shall not be placed in snow or on soft or frozen subgrade.

After being uniformly spread, the surfacing material shall be harrowed with a spike tooth harrow and floated with a road drag or grader until the surface is free from waves or irregularities. Harrowing and floating shall be continued until the surface has the required grade, line and cross section as shown on the plans, except that the harrowing shall not be carried on at such time or to such extent that the fine material will be separated from the coarse material. If the surfacing material is not thoroughly compacted by traffic before final acceptance or placement of hot asphaltic concrete pavement, then it shall be accomplished by means of suitable roller and wetting to obtain maximum density.

Use of Roadway During Construction

The Contractor may prepare the subgrade of the roads at the start of construction and use them throughout the construction period either with or without placing the surfacing material. If the crushed stone or gravel is placed and the road used during construction period, then the Contractor shall perform all necessary patrol maintenance at frequent intervals and add any additional crushed stone or gravel required to maintain the road. Before the final acceptance of the work, the roads and parking area including shoulders shall be brought to the grade and cross section shown on the plans and left in a condition satisfactory to the Engineer.

Roadway Ditches

All open ditches and channel changes parallel to and adjacent to the road shall be performed as a part of the roadway work. Lines, grades and cross sections of ditches shall be as shown on the plans unless otherwise required by the Engineer to obtain proper drainage.

Hot Asphaltic Concrete Pavement

Where shown on the plans or specified, the Contractor shall construct hot asphaltic concrete pavement over the compacted gravel or crushed stone surface course.

The hot asphaltic pavement construction shall be performed in accordance with the applicable sections of the latest edition of the Indiana State Highway Commission, referred to herein as "State Specifications".

The surface of the gravel or crushed stone surface course shall be graded to the required elevations and cross sections as shown and/or as established by the Engineer. All soft spots and/or unstable or unsatisfactory base material shall be removed and replaced with suitable granular material to provide a satisfactory base beneath all area to be paved. The newly placed or previously placed base material shall be scarified, brought to optimum moisture condition and thoroughly compacted ahead of the paving operations.

The hot mix asphaltic concrete shall be constructed in two courses. Section 403 of the State Specifications shall govern the materials and construction of the hot asphaltic concrete pavement except that only crushed stone shall be used in the surface course. Each binder course shall be laid to a one and one half (1 ½) inch thickness (one hundred sixty-five (165) pounds per square yard) and the surface course shall be laid one (1) inch thick (one hundred ten (110) pounds per square yard). All of the asphaltic concrete surface shall be Type B of the State Specifications.

(SECTION WM - 31)

SEEDING AND SODDING

General

The areas to be seeded shall be those areas which are shown on the plans or as specified in the Detailed Specifications.

Prepared Seedbed

Prior to start of preparation of seeding the Contractor shall remove all kinds of debris, sheds, tools, equipment and materials from the area to be seeded. The areas to be seeded shall be loosened and reworked by means of discing, harrowing, and rolling; or reworked by means of powered rotary tiller; so that the ground will be left in a satisfactory manner ready for seeding. The surface of the area to be seeded shall be left smooth and uniform which conforms to the finished grades and cross sections as shown on the plans, or as otherwise specified.

Time of Seeding

Spring seeding shall be done between March 1 and May 15, and Fall seeding between August 15 and October 15. During these periods, the time of seeding shall be determined by the Engineer whose decisions shall be based on the moisture content of the soil, and weather conditions. The Engineer may, at his option, extend the seeding season. (Mulched seeding may be done between March 1 and October 15 or possibly later in the fall.)

Lime, Fertilizer and Seed

Lime: Agricultural hydrated lime shall be uniformly applied at a rate of one (1) ton per acre over the area to be seeded unless otherwise specified. The Contractor may substitute one and one half (1 ½) tons of agricultural ground limestone for one (1) ton of agricultural hydrated lime.

Fertilizer: Fertilizer of the 10-20-10 grade shall be uniformly applied over the area to be seeded at the rate of 0.44 ton for each acre to be seeded unless otherwise specified. The above fertilizer is equivalent to four hundred (400) pounds ammonium sulphate, 20%N; three hundred fifty-five (355) pounds triple super phosphate, forty-five percent (45%) P_2O_5 ; one hundred thirty-three (133) pounds murate of potash, sixty percent (60%).

Spreading Method: The lime and fertilizer shall be spread uniformly over the area to be seeded, and shall be mixed into the top two (2) inches of soil with a disc harrow, rotary tiller, mixer or hand raking.

Seed: Unless otherwise specified, the following Pure Live seeds shall be mixed and applied at the rate of one hundred twenty (120) pounds per acre (2.8 pounds per 1,000 square feet):

Kentucky Bluegrass - Pao Pratenis -----	70 lb.
Kentucky 31 Fescue - Festuca Elatior,	
var. arundiancea -----	30 lb.
Red Fescue - Festurca rubra -----	30 lb.

Seeding Method

The Contractor shall employ the broadcasting method for seeding. The sowing seed mixtures shall be kept thoroughly mixed during the sowing operations to prevent separation of species and the subsequent lack of uniform distribution of species. The sowing shall be stopped when satisfactory results are not likely to be obtained due to excessive moisture, high winds, or other unfavorable conditions.

Seed shall be broadcast by either hand or by approved sowing equipment at a rate which will provide not less than the minimum quantity of pure live seed as specified. The seed shall be uniformly distributed over the designated areas. If sowing is by hand methods, one half ($\frac{1}{2}$) the seed shall be sown when the sower is moving in one (1) direction and the remainder sown with the sower moving in right angles to the first direction. Where seed is sown by means of approved broadcasting equipment, the seed may be sown with a single pass of the equipment. Broadcast sowing shall not be done during windy weather. The seed shall be covered by means of a brush harrow, spike tooth harrow, chain harrow, cultipacker, or other approved device, so that most of the seed will be placed within a satisfactory depth range.

After the seed has been sown, and prior to compacting, the lawn area shall be cleared of all stones or other objects larger than two (2) inches in greatest diameter, and all wire, roots, brush or other objects that may interfere with subsequent mowing operations.

Mulched Seeding

General

When specified in the Detailed Specifications, the required mulch seeding shall consist of seeding as specified hereinbefore under the heading of "Seeding", and then covering the seeded areas with mulch.

Mulch

The mulching material may consist of straw, chaff, clover, timothy, alfalfa, peppermint or soy bean hay, shredded fodder or clover chaff. All mulch shall be free from primary noxious weeds as set forth under Section 913.04 of the Indiana Department of Highways Standard Specification.

The mulching material at the time of delivery to the site of the work shall not contain more than fifty percent (50%) moisture. The mulching material shall be applied uniformly in a continuous blanket to a depth of approximately two (2) inches. After being held down, the mulch shall be thoroughly wetted, care being taken not to displace the seed or soil underneath.

Holding Mulch in Place

Unless otherwise specified, the mulch shall be held in place in accordance with Section 621.04, Method 1, 1985 IDOH Specifications. Regardless of the method used, the mulching material shall be satisfactorily maintained in place until final completion and acceptance of the work.

Sodding

General

The areas to be sodded shall be those areas which are shown on the plans or as specified in the Detailed Specifications. Sod shall be fibrous, well rooted bluegrass, or other approved sod, with the grass cut to a height of not more than three (3) inches. Edges of sod shall be cleanly cut, either by hand or machine, to a uniform thickness of not less than one and one half (1 1/4) inches, to a uniform width of not less than sixteen (16) inches, and in strips of not less than three (3) feet in length.

Sod shall be free from all primary noxious weeds as defined by the Indiana State Seed Law.

Preparation of Ground before Sodding

The area to be sodded shall be smooth and uniform, and shall conform with the cross section required by the Plans or as directed. Grades prepared for sod shall be of sufficient depth below adjacent unsodded areas so that newly laid sod will conform with the surrounding surface.

After the grade has been prepared, and the topsoil has been spread, three fourths (3/4) lb. of agricultural hydrated lime and one fifth (1/5) lb. of 10-20-10 fertilizer shall be applied to each square yard, and thoroughly mixed into the top two (2) inches of soil. The area shall then be raked, and all clods, stones and debris removed.

Laying Sod

Sod strips shall be carefully laid by hand in the direction designated by the Engineer. At the edges of sodded areas the sod shall be carefully fitted into the grade, if excavated.

The sod strips shall be butted closely together to avoid any open joints. After laying and the initial watering, the sod shall be firmly tamped or rolled to insure firm contact with the soil underneath and shall conform with the surrounding surface. After compaction, the sod shall present a smooth, even surface, free from lumps and depressions.

Sod placed on slopes shall be pegged if directed by the Engineer. Pegs shall be driven down until not more than one (1) inch protrudes above the sod surface. The number of pegs shall be sufficient to hold the sod in place.

Watering Sod

The sod shall be thoroughly watered immediately after placing, and the watering continued for at least seven (7) days. If, at the end of thirty (30) days the sod is in good growing condition, the Contractor will not be required to repair or replace any sod which may thereafter be injured or damaged because of drought, unless written agreement for out of season sodding provides otherwise. The Contractor shall furnish the water at his expense.

Seasonal and Temperature Limitations for Sodding

No sod shall be laid during the months of June, July and August, unless written permission is obtained from the Engineer. When such permission is received the Contractor shall, before laying the sod out of season, agree in writing to the following provisions:

1. Sod shall be in good, live and growing conditions;
2. Sod shall be placed within thirty-six (36) hours after cutting and during that period be protected from damage;
3. Sod shall be watered sufficiently, and otherwise maintained so that it will be in a live, growing condition at the time other items of the contract are accepted, provided the period between placing sod and acceptance is greater than thirty (30) days.

Winter sodding will be permitted when the temperature is above thirty-five degrees Fahrenheit (35° F). No frozen sod shall be laid and no sod shall be laid on frozen soil. Sod shall be properly protected from drying out or freezing and shall be laid within forty-eight (48) hours after cutting.

(SECTION WM 34)

BUILDINGS AND SUPERSTRUCTURES

(SECTION WM 34A - MASONRY WORK)

Materials

Brick: All brick shall be whole, sound, thoroughly burned, red shale brick of the types specified or required. Unless otherwise shown on plans or specified, the brick shall be standard size, two and one fourth by three and three fourths by eight ($2 \frac{1}{4} \times 3 \frac{3}{4} \times 8$) inches. Blend and color shall be as shown on the plans or as ordered by the Engineers. Bricks shall be delivered by truck, carefully unloaded by hand, culled by the Contractor and separately piled according to class.

Lightweight Concrete Block units shall conform to the requirements of ASTM Specification C 90 for Type I Hollow Load Bearing Concrete Units. Blocks shall be eight by twelve by sixteen ($8 \times 12 \times 16$) inches, eight by eight by sixteen ($8 \times 8 \times 16$) inches, eight by six by sixteen ($8 \times 6 \times 16$) inches, or eight by four by sixteen ($8 \times 4 \times 16$) inches as per where shown on the plans, with special and fractional units as required. Specials as noted or detailed on the plans, and any other special shapes required shall be furnished. Units with special insulation and or decorative properties shall be furnish as shown on the Plans or specified in the Detailed Specifications.

Mortar for masonry, unless otherwise specified or ordered, shall be cement-lime mortar, machine mixed, using the following materials, or equal: sand-fine, sharp and clean, ASTM C 144; lime, ASTM C 207, Type S; cement - Portland cement, ASTM C 150, Type I; water - fit to drink. Mix shall be by volume using one (1) part of cement, one and one fourth ($1 \frac{1}{4}$) parts of hydrated lime, and five and one half ($5 \frac{1}{2}$) parts of sand. For increased water retentivity and shrinkage control, admixtures may be used in accordance with directions of the manufacturer.

Only sufficient mortar shall be prepared for immediate use, and any mortar that has set shall not be retempered or used in the work. Prepared or patented mortar may be used only with prior approval by the Engineer. Setting accelerators or antifreeze compounds shall not be used.

Dovetail Anchor Slots shall be placed vertically in all concrete walls where masonry is to be laid. All anchors shall be made of 24 gauge galvanized steel and provided with filler to prevent cement grout from seeping into the slot opening. The slots shall be placed twenty-four (24) inches O.C., unless otherwise shown.

Dovetail Ties shall be made of galvanized steel designed to fit the conditions or anchorage of the masonry to the concrete walls. Brick anchors shall be not less than 14 gauge. Stone anchors shall be not less than three sixteenths ($3/16$) inch thick. The dovetail ties shall be installed twenty-four (24) inches O.C., unless otherwise shown. Where masonry frames into structural steel, approved galvanized metal ties of required length shall be fastened to the steel columns at not less than twenty-four (24) inches O.C.

Wall Reinforcement for masonry walls shall be standard weight "Block-Trus", "Dur-O-Wal", or equal butt weld steel of trussed design. Unless otherwise shown, the wall reinforcement shall be placed in first and second bed joints eight (8) inches apart immediately above lintels and below sills at openings and in every second bed joint (sixteen (16) inches O.C.) throughout remainder of structure. The reinforcement in first bed joint immediately above and below openings shall be

continuous. In second bed joint the reinforcement shall extend two (2) feet beyond each side of opening. All other reinforcement shall be continuous except where there are vertical masonry control joints. Reinforcement shall be lapped not less than six (6) inches at splices. Corners shall be cut and bent for continuous reinforcement. Cavity type walls shall be tied and/or reinforced at above specified intervals with galvanized steel "Block-Truss", "Dur-O-Wall", or equal, trussed style, heavy duty with drip-section. Vertical reinforcing shall be as shown on the plans.

Control Joints

Vertical control joints shall be constructed where shown on the plans and where directed by the Engineer or dictated by common practice. Joints shall be constructed by sawing brick or masonry units as required to create the vertical joint. The mortar shall be racked from both faces of the joint to create a one-half (1/2) inch deep recess. After the mortar has achieved its initial set, the recess shall be filled with an elastomeric caulk such as silicon which has been tinted to match the mortar color. Horizontal reinforcing shall continue thru the joint.

Masonry Methods

Wetting of Brick - except in freezing weather, all brick shall be thoroughly wetted as necessary to reduce their rate of absorption of water at the time of laying.

Laying - all masonry shall be laid up true to line, plumb and square with full bed and head joints. All brick and concrete block shall be slightly shoved and tamped into position. Concrete blocks shall have full mortar coverage on vertical and horizontal faces. All spaces shall be solidly filled with mortar. Courses shall be carried up level and no section of wall shall be carried more than three (3) feet above any adjacent section, except as specifically permitted. Brick and concrete units shall be properly coursed and bonded with vertical joints forming a neat regular pattern.

All joints shall be approximately three eighths (3/8) inch uniform thickness. Horizontal and vertical joints shall be tooled, struck to remove projecting mortar, and given final tooling to produce a compacted smooth and concave surface.

Solid Wall Construction - Except where metal ties are shown or required for bonding, the brick masonry shall be bonded by headers at every sixth course on both interior and exterior faces. Every header shall be separated by two (2) stretchers. The back of the exterior brick course on the front of the backup shall be plastered with a mortar coat of not less than three eighths (3/8) inch thickness. The interior or exterior masonry course shall then be laid immediately. In any case, all spaces between masonry units shall be filled solid with mortar. Solid type wall construction shall be water-tight against driving rains. If necessary, joints shall be cut out and repointed or the wall shall be taken down and rebuilt to make them watertight at the expense of the Contractor.

Cavity Wall Construction - Cavity type of walls, where shown on the plans shall be reinforced or tied as specified above under the heading "Wall Reinforcement". Weep holes at approximately four (4) feet centers shall be provided at the bottom exterior face of any cavity type masonry walls. The weep holes may be formed by placing well-greased sash cord or rubber tubing in the horizontal mortar joints and pulling them out after the mortar has hardened; or they may be formed by leaving a small opening in the head joint. The cavity shall be kept clean in an approved manner. An approved waterproof flashing shall be provided at the bottom of the wall and over doors, windows or other openings in the walls to prevent the formation of moisture or entry of water to the inner wall.

Protection - Cover all walls with waterproof canvas or heavy fibered and tarred paper, after each day's work and during rains.

To facilitate heating and protection of masonry work and of the interior of structure, temporary enclosures shall be made of all doors, windows and other openings.

When atmospheric temperature is forty degrees Fahrenheit (40° F) or lower, or whenever the government weather bureau predicts such temperatures within the twenty-four (24) hours succeeding, the masonry work shall be protected. All masonry materials and mortar ingredients shall be heated, as deemed necessary by the Engineer to prevent freezing. Protection and heating shall be as follows, subject to such modification as the Engineer may direct or approve.

During and following the laying of masonry work, the work shall be housed in or sufficiently covered and heated to a temperature of not less than fifty degrees Fahrenheit (50° F) for a period not less than seventy-two (72) hours after the masonry work is completed.

Bricklayers' scaffolding shall be enclosed by means of screens formed of canvas, wood or other material satisfactory to the Engineer. Other means for the protection of masonry work and workmen may be submitted by the Contractor to the Engineer for approval.

Mortar shall be mixed in an approved mechanical mixer and shall be maintained at a minimum temperature of fifty degrees Fahrenheit (50° F) during mixing, distributing and placing. Mixing water shall not be heated in excess of one hundred forty degrees Fahrenheit (140° F). Sand for mortar shall be heated so as to remove all frost, but shall not be heated to the point of scorching. The use of calcium chloride or other salts in any ingredients for mortar will not be permitted.

Protection and heating facilities shall be submitted to the Engineer for approval. Heating by the use of steam is preferred. If salamanders are used, they shall be fired with coke and satisfactory precautions taken to prevent drying of brickwork. All protective and heating facilities, including fuel, shall be furnished, installed, maintained, and operated at the sole expense of the Contractor.

Masonry Around Openings, Etc. - Window and door frames shall be set plumb and true, and securely braced. No brick smaller than a header shall be used at window jambs, door jambs or other openings. Sills and lintels shall be set at their proper elevations without the use of half courses. All joints between masonry and window or door frames shall be thoroughly filled with mortar. Sills, lintels, bearing plates, etc., shall be set in full beds of mortar.

All interior partitions shall be bonded, or tied, to exterior walls and anchored, or tied, to steel framework or joists in accordance with best accepted practice.

Unless otherwise shown, the coursing shall be so arranged as to give at least two courses of solid brick under all concrete slabs or beams and beneath all steel or wood joists and beams. The first bearing course of concrete block masonry beneath the two brick bearing courses shall be solidly filled with concrete or mortar.

The Contractor shall build-in, as required or directed, all anchors, flashings, sleeves, piping, conduits, frames, brackets, structural steel plates, loose lintels and similar miscellaneous iron work, as well as other items to be built into masonry. Pipe chases, pockets, etc., shall be built as shown or required.

Cleaning - All exposed masonry shall be cleaned down with soap powder or detergent and clean water applied with stiff fiber brushes and again washed and rinsed with clean water. All mortar droppings shall be removed from projecting surfaces of whatever kind. If, in the opinion of the Engineer, wire brushes and soap and water do not suffice for cleaning of face brick, the brick surface shall be thoroughly wetted with clean water and then scrubbed with a solution of not more than one (1) part hydrochloric (muriatic) acid to twenty (20) parts water, followed immediately by a thorough rinsing with clear water. If masonry is cleaned with an acid solution, then all sash, metal lintels and other metal subject to corrosion shall be thoroughly protected.

Water Repellent

The exterior surfaces of all exterior brick masonry walls shall be given two (2) saturating coats of ready to use silicone base water repellent. The coating shall be applied by either a low pressure spray apparatus or an ordinary paint brush in accordance with the recommendations of the manufacturer of the repellent. Water repellent shall not be applied prior to satisfactory completion of cleaning operations as determined by the Engineer.

(SECTION WM34B - CARPENTRY)

General

Lumber shall be of the kind, size and dimensions shown on the plans, as specified and required for the work for which the lumber is to be used. All lumber shall be well seasoned and kiln-dried containing not more than twelve percent (12%) moisture. For any purpose the lumber shall be free from shakes, waves, black and unsound knots and all kinds of decay. All lumber shall be squared to the required dimensions throughout the entire length. Lumber grades for the different items shall be commercial grades and shall be graded under the respective grading rules of the producing associations.

Materials

Unless otherwise shown on the plans or specified in the Detailed Specifications, the species and grade of lumber to be installed in the various locations shall be as follows:

Rough Lumber Usage

Kind of Wood & Grade

Framing - joists, rafters
studs, studs, bucks, plates

No. 2 or better, Douglas Fir or Southern Yellow Pine

Furring, grounds, ribbons
bridging, blocking

No. 2 or better, Douglas Fir or Southern Yellow Pine

Wood trusses and purlins
or joists for use with wood trusses

Structural grade Douglas Fir or No. 1 Southern Yellow Pine

Exterior finish and trim,
exterior doors, windows
and door screen frames

Red Cypress, "C" Select, or White Pine, "C" Select, or
Redwood, Cert, Kiln Dried, Clear all heartwood

Rough Lumber Usage

Kind of Wood & Grade

Window sash Ponderosa

White Pine, "C" Select, except bottom rail shall be Red Cypress "C" Select

Interior finish and trim

White Pine, "C" Select, or Ponderosa Pine, "C" Select

Shelving

White Pine "C" Select

Cabinets and counters

Clean White Birch or Oak

Wood doors

No. 1 grade of the National Door Mfg. Association for flush panel Ponderosa Pine doors. Exterior doors one and three fourths (1 3/4) inch thick, Interior door one and three eighths (1 3/8) inch thick

Timbers - Lumber for heavy timbers stressed in bending, compression or tension shall be structural grade Douglas Fir or No. 1 Southern Yellow Pine.

Workmanship

Lumber and millwork delivered to the site shall be carefully piled off the ground in such a manner as to insure proper drainage, ventilation and protection from the weather.

All nailing blocks, wood bricks, grounds, and wood blocking shall be installed as required, and shall be of good sound wood of proper dimensions, securely anchored to the masonry. Blocks and grounds for nailing trim, frames, and other finish woodwork shall be spaced at not over sixteen (16) inch centers. Grounds shall be plumb, level, straight, and true to line.

All wood members shall be neatly fitted, securely nailed or bolted and properly supported. All rough and finish hardware shall be installed in a neat and workmanlike manner. Trim shall be neatly put in place. All joints at the end of trim shall be caulked and intermediate joints shall be mitred. Moldings shall be in long pieces. All joints shall be put together with stiff white lead.

Finishing nails properly driven and set, or screws properly countersunk shall be used. Drilling for nails and screws shall be done if necessary to prevent splitting. Material with hammer marks or other defects shall be replaced with undamaged material. All work shall be securely anchored to the masonry. The effect of swelling and shrinkage shall be considered in securing woodwork and precautions taken to prevent warping and the opening of mitres and splits. End of sills shall in general be given a coat of lead and oil.

All wood trim and millwork, except surfaces which are to receive stain and varnish finished, shall be primed on all surfaces with lead and oil paint in strict accordance with standard practices. At the option of the Contractor, priming may be done at the mill.

(SECTION WM 34C - PRECAST CONCRETE ROOF SLABS)

The roof slabs shall be constructed of precast units of cross-section and lengths shown on plans or as specified. Unless otherwise shown or specified they shall be reinforced by the manufacturer to carry a uniform superimposed load of fifty (50) lbs. per square foot. Tension reinforcing steel shall be hot rolled rods or equivalent with a yield point of at least 45,000 lbs. per square inch. All concrete shall have a minimum compressive strength of 3750 lbs. per square inch. The slabs shall be cured by the manufacturer by keeping them damp for seven (7) days or by the equivalent of this in steam curing. One eighth (1/8) inch thick Masonite board bearing pads shall be provided beneath bearing ends of the slabs and rod foam or equal sealing pads shall be provided between the roof slabs and the top of all non-bearing walls.

The slabs shall be grouted by a mixture of not less than one (1) part cement to three (3) parts fine sand, care being taken to see that the joints are filled. The units shall be installed tight together and at right angles to the bearing wall. The slabs shall be aligned and leveled in a workmanlike manner using equipment recommended by the manufacturer.

The open ends of all slab cores shall be insulated to a minimum depth of twelve (12) inches with "Fiberglas" insulation.

Openings shall be neatly formed and properly reinforced in the slabs at the locations shown on the plans. Caulk along exterior joints at junction of slabs with the bearing masonry walls. Caulking compound shall be gun consistency and as specified under "Caulking".

Erection drawings shall be prepared showing all details and submitted to the Engineer for approval prior to manufacture.

(SECTION WM 34D - ROOFING AND INSULATION)

The Contractor shall cut and fit in place four by four (4 x 4) inch cant strips around the inside edge of the roof and if necessary around vent openings.

Roof applicator shall carefully inspect surfaces to be covered and check cant strips, saddles, etc. for proper grade and drain before starting application, and he shall report to the Engineer any defects that will affect the proper application or durability of the roof, so same can be corrected before starting the application of the roofing or insulation. Over the entire area, mop on one (1) inch of fibre insulation board and a dry sheet, breaking joints as recommended by the manufacturer of the roofing materials used.

After the deck is in proper shape to receive same, applicator shall furnish and place four (4) piles of 15# saturated asphalt felt lapping each ply twenty-four and one half (24 & 1/2) inches over the preceding one (1), mopping the full width under each with an approved brand of roof pitch.

Over the entire area pour a uniform coating of an approved brand of pitch and embed therein, while hot, 400# of roofing grade gravel per one hundred (100) square feet.

Roof flashing shall extend up on the vertical surfaces as shown. Also extend the flashing and make watertight connection with any existing adjoining roofs.

The Owner reserves the option of requiring the material manufacturer and roofer to furnish a twenty (20) year Surety Bond which shall be drawn up in a form approved by the Engineer. In such case the roofer shall be reimbursed by the Owner in the amount of the actual charge made by the manufacturer for the bond.

(SECTION WM 34E - FLASHING AND SHEET METAL)

Materials: All materials incorporated in the finished work shall be furnished in compliance with the following specifications. All roof flashing and counter flashing, except as otherwise shown or specified, shall be fabricated of sixteen (16) ounce copper or aluminum, with all seams where necessary soldered, and overlaps in the direction of flows.

All gutters, scuppers, and downspouts shall be made of twenty (20) ounce copper or aluminum. The scuppers shall be molded of design and size shown on the plans and fitted with bottom outlet for connection to downspout. Provide copper or aluminum flashing around scuppers ready to receive roofing. The downspouts shall be of size and length shown on the plans. Caulk joint between downspout and cast iron soil pipe drain.

Fascias and gravel stops shall be of design shown of the plans, and unless otherwise shown, shall be made of thirteen (13) gauge aluminum.

All concealed flashing as shown on the plans for base of walls, over lintels, beams beneath window sills, etc. shall be made of three (3) ounce insulating and waterproofing barrier, unless otherwise noted or specified.

Installation: All sheet metal and flashing shall be fabricated and installed by skilled workmen accordance with the best standard practice. Counter flashing shall be placed into the parapet wall and existing walls as detailed on the plans. All flashing, counter flashing, gravel stops and fascias shall be installed in accordance with the manufacturer's direction and in compliance with the requirements for issuance of a surety guaranty roof bond. Scuppers through parapet walls where shown on plans shall be fabricated and flashed to prevent entrance of water into the wall. Flashing at parapet walls, valleys, roof drains, vent pipes, lintels, sills, and other locations shall be installed where required to provide tight walls and roofs and as detailed on the plans.

All necessary changes in existing gutters, downspouts, flashing, etc. shall be made in a satisfactory manner to fit the new work to the existing structures and make watertight.

(SECTION WM 34F - VITRIFIED CLAY WALL COPING)

All wall copings shall be vitrified clay coping in glazed reddish brown color. Corner units shall be provided for all corners. All joints shall be caulked solid with masonry mortar except that exposed face of the joints shall be raked clean to a one half (½) inch depth and later caulked solid with gun consistency compound.

(SECTION WM 34G - CUT STONE AND CAST STONE)

Cut Stone

Cut stone shall be standard gray, Indiana Oolitic limestone, building stock, free from all defects that would materially impair the strength, durability or appearance, and shall have a smooth rubbed finish.

All cut stone shall be dressed so as to have uniform close fitting joints and be cut so that brick backing will bind into the stone. The reveals and top beds shall be smoothly rubbed. Window and door sills shall have proper washes and seats. All work shall be squared and full edge. All projecting members shall be provided with deep drip. Offsets and coping shall be beveled. Where shown or required, holes, chases, openings, recesses, etc., shall be cut for steel beams, anchors, conduits, downspouts, etc. Stones shall have at least four (4) inches bearing on walls.

Cast Stone

Cast stone shall be made of Class A concrete as defined in the Workmanship and Materials Specifications for "Concrete". The cast stone shall be of uniform color, free from all defects which will impair the strength, durability or appearance, and shall be free of stains. The finish of the exposed surfaces shall be smooth, showing no form or mould marks. Cast stone which shows voids, cracks, chips or other defects will be rejected.

Cast stone shall be accurately cast to shape and dimensions. Exposed plane faces shall be true with beds and joints straight at right angles to the face, unless otherwise shown. Washes shall be cast on top of all copings, sills and base courses as shown, with lugs and seats for masonry work where indicated. All projecting members shall be provided with deep drip. Stones shall have at least four (4) inches bearing on walls.

Drawings

Prior to manufacture of cut stone and cast stone, complete shop and setting drawings of the stonework shall be submitted to the Engineer for approval. Shop drawings shall show accurately, in detail, dimensions and sections of the stone, and details of the trim, joining, bonding and anchoring.

Handling and Installation

All cut stone and cast stone shall be carefully transported and handled to prevent damage and shall be stored above ground with covering, all in a manner to prevent stains and/or discoloration.

Every stone shall be set on a full bed of mortar with vertical joints full. The vertical joints of copings shall be raked out to a depth of one half (½) inch and caulked with a gun grade of synthetic rubber sealing and caulking compound.

Mortar shall be nonstaining cement lime mortar composed of one half (½) part nonstaining cement, one half (½) part of lime paste and three (3) parts of clean fine sand. Sand and lime shall be thoroughly mixed and the cement added.

All projecting members shall be protected where necessary with wooden guards to prevent damage during construction. All stone shall be thoroughly and satisfactorily cleaned upon completion of the work before final acceptance.

The Contractor shall furnish and set all anchors, dowels, etc., and make all sinkages, holes, ties, etc., for placing same. Provision for the proper anchoring, dowelling and cramping of work in keeping with standard practices, including support of stone by shelf angles and loose steel when required, shall be clearly shown on shop drawings. Galvanized iron anchors shall be used for the anchoring of the stone to masonry backing.

(SECTION WM 34H - CAULKING)

Caulk around all exterior windows and door frames and make the job watertight. Also, perform all other caulking as specified and as shown or noted on the plans. Unless otherwise shown or specified, the caulking compound shall be gun consistency, "Kaukit" as made by Sonneborn, "Vulcatex" as made by A.C. Horn, or equal.

(SECTION WM 34I - MISCELLANEOUS IRON AND ANCHORS)

Furnish and install all anchors, rings, covers, inserts, sleeves, anchor bolts, supports, hangers, etc., shown on the plans or required to complete the job. Furnish and install dovetail anchors, in all concrete walls which are shown to be covered with a brick veneer. Dovetail anchors shall be spaced to not exceed twenty-four (24) inches on vertical centers.

(SECTION WM 34J - METAL DOORS AND TRIM AND HARDWARE)

Door sizes and location shall be as noted on the plans. Unless otherwise shown or specified, exterior and interior doors shall be of hollow metal; frames and accessories shall be stock manufacture constructed to the size, shape and pattern shown on the plans. Frames, jambs, and trim shall be No. 16 U.S. gauge and of welded construction. The frames shall be securely anchored to the masonry and shall be set plumb and true. The jamb shall be reinforced and rabbeted to receive hinges for the door.

The exterior door frames which are shown or specified to be equipped with aluminum screen doors, shall be furnished with concealed reinforcement and mortised to receive the hardware of the screen door. The template requirements for the screen door shall be furnished by the Contractor. Exterior doors shall be one and three fourths (1 3/4) inches thick and interior doors one and three eighths (1 3/8) inches thick unless otherwise shown on the plans. Doors shall be formed of eighteen (18) gauge metal with proper reinforcement, stiffeners and welded joint ground smooth. Panels shall be insulated with one fourth (1/4) inch sound retarding filler and stiles and rails where used shall have cork fillers to eliminate metallic sound. Where required or shown, moldings shall be formed of twenty (20) gauge metal and shall be secured by screws. Stiles in panel doors shall be not less than five (5) inches wide.

The bottom of all exterior doors shall be provided with hook spring bronze weatherstripping. The doors shall also be provided with a bronze umbrella stripping along the bottom exterior face of the door to shed rainwater runoff away from the threshold.

All doors shall have one (1) prime coat and two (2) finish coats of enamel baked on at the factory in a color to be selected by the Owner unless otherwise designated. Frames shall be prime finished at the factory, dipped or sprayed and baked. Final finish will be applied at the site.

Doors shall be "Ceco", "Fenestra", "Richmond", or equal.

Door Closers - Unless otherwise shown on the plans or specified, the door closers shall be Norton Regular Surface Closer, LCN Traditional, or equal.

Hardware - The hardware, locks and hinges shall be made of bronze, dull finish, as furnished by the door manufacturer. Unless otherwise specified, the locks shall be furnished with key on one side and turn button on other side. If possible, the locks shall be master keyed to fit the existing locks; otherwise, the new locks shall be keyed to fit the new doors only. Bronze rubber nosed floor or wall type bumpers shall be provided for all interior doors. Hardware may be the standard product of the metal door manufacturer, equivalent to Yale & Town Mfg. Co., Sargent Co., Russel & Erwin Mfg. Co., or equal.

(SECTION WM 34K - ALUMINUM SCREEN DOORS)

Size, number and location of screen doors shall be as shown on the plans. Screen door frames shall be made of extruded aluminum alloy 6063-T5 with one and one eighth by three and one half by one eighth ($1 \frac{1}{8} \times 3 \frac{1}{2} \times \frac{1}{8}$) inch wall and shall be of welded construction. The doors shall be of the combination type with interchangeable aluminum framed DSB glass and screen panels. The lower panel of the door shall be provided with a #12 guard woven from .062 inch x five sixteenths ($\frac{5}{16}$) inch round edge flat aluminum wire on one and one half ($1 \frac{1}{2}$) inch centers and mounted in #60 extruded aluminum. Kick plates which are .090 inches thick shall be provided.

The aluminum doors shall be given belt polish finish (C-I) over their entire surface and then receive two (2) coats of methacrylate lacquer.

The door shall be provided with complete hardware including door closer, lock and hinges. The hardware shall be U.S. 26D (dull chrome) finish except door closer which shall be painted in aluminum color. Suitable dielectric insulators shall be provided where aluminum connections are made to ferrous metals.

(SECTION WM 34L - THRESHOLDS)

Unless otherwise shown or specified, all exterior doors shall be provided with aluminum thresholds four (4) inches wide by one half ($\frac{1}{2}$) inch high with integral water stop providing weather protection. Thresholds shall be embedded in a full bed of cement mortar, or caulking compound and anchored solidly to the floor.

(SECTION WM 34M - ALUMINUM AND STEEL SASH)

Unless otherwise shown or specified, aluminum and/or steel sash windows shall be of size and type as noted on plans, commercial projected, as manufactured by Ceco, Bayley or equal. Ventilator of all windows shall project out, unless otherwise shown.

The sash shall be set plumb and true, properly aligned and secured to the brick jambs, sills and lintels by approved anchors, or bolts and clips.

Hardware throughout shall be bronze for steel sash and aluminum alloy for aluminum sash. Ventilators shall be fitted with cam locking handle. Steel sash windows shall receive one (1) coat of rust-resisting primer before shipment from the factory. Screens shall be provided for all vent openings designed for easy attachment from inside of building. Screen frames shall be of solid extruded aluminum shapes. Screen cloth shall be heavy weight No. 18 mesh, aluminum hardware cloth held in frames by aluminum splines.

(SECTION WM 34N - GLASS AND GLAZING)

Windows shall be glazed using a good grade of steel glazing compound. Glass shall be properly puttied, secured by glazing clips, then puttied in a neat manner.

Unless otherwise specified, all windows and doors shall be glazed with clear sheet glass, double strength "A" quality, not less than one eighth (1/8) inch thick, and all doors shall be glazed with one fourth (1/4) inch thick plate glass.

(SECTION WM 34 O - GLASS BLOCK PANELS AND GLASS BLOCK VENTILATORS)

Glass Block Panels Glass

Blocks: shall be hollow units of pressed glass hermetically sealed at high temperature. The blocks shall be furnished in size shown on plans.

Furnish all materials and do all work necessary to install the glass block panels as shown on the plans and as specified.

Mortar shall be same as specified for masonry work. Reinforcing wall ties shall be galvanized. Asphalt emulsion, oakum, caulking compound and expansion strips shall be provided as recommended by the glass block supplying manufacturer.

Installation: all sills receiving glass blocks shall be coated with a heavy layer of asphalt emulsion at least one sixteenth (1/16) inch thick which shall be allowed to dry before laying the first bed of mortar. Install expansion strips at panel jambs and head, below shelf angles, at mullions and other places as shown on plans. Strips shall run continuously so that edges of the glass block panel do not come in contact with the building structure, except at sills. Blocks shall be laid plumb, true and level with all mortar joints filled completely with mortar, shall run continuously with ends lapped six (6) inches, installed in mortar joints which are approximately twenty-four (24) inches apart. Joints shall be tooled smooth and slightly concave just before mortar attains initial set so that exposed edges of the block are sharp clean lines.

Pack oakum between the faces of the block and the sides of the chases after the mortar has set. Ram the oakum back at least three eighths (3/8) inch from the finished surface. Fill the recess thus formed at jambs and heads of panels with mastic caulking compound, both inside and out to provide tightly sealed panels. Surplus mortar shall be removed and the faces of the block shall be wiped dry at the time the joints are tooled.

Glass Block Ventilators: Unless otherwise shown on the plans or specified, glass block ventilators, or ventilating windows to be installed in glass block panels, shall be either the Residential Hopper Type or Commercial Projected Type as noted on the plans. The frames and sash shall be made of 63ST-5 aluminum alloy. Head section of ventilator units shall be designed to be load bearing for

the glass blocks above. Each unit shall be provided with latch and screens. Screen cloth to be 18 mesh alclad aluminum. Residential type ventilators shall be furnished with 7/32 inch glass retained in aluminum side wings by the manufacturer. Glass to be clear, except obscure for toilet rooms, unless otherwise noted. Glazing for commercial projected type ventilators shall be done by the Contractor.

Installation of the glass block ventilators shall be performed in accordance with the instructions of the manufacturer.

PART 7

SPECIAL PROVISIONS

PART 7

SPECIAL PROVISIONS

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PART 7

SPECIAL PROVISIONS

1. Application of Special Provisions/Specifications

The purpose of these Special Provisions is to amplify the Information for Bidders, General Conditions, and/or the General Construction Specifications. Whenever conditions as set forth in any of the Specifications conflict with conditions of other Sections of the Specifications, the following order of precedence shall apply:

- a. Part 7 Special Provisions
- b. Part 3 General Conditions
- c. Part 2 Information for Bidders
- d. Part 8 Detailed Specifications
- e. Part 5 General Construction Specifications
- f. Part 6 Workmanship and Material Specifications

2. Additions to the General Conditions

2.1 Article 13 - Changes in the Work

Under Article 13, paragraph 13.1 the sentence reading "If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER" shall be changed to read:

"If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER and no other method."

In addition, the following sentence shall be added directly following the above correction: "The CONTRACTOR specifically agrees that no action for equitable adjustment may be brought unless the CONTRACTOR has secured a CHANGE ORDER signed by the OWNER prior to the commencement of the WORK covered by such CHANGE ORDER."

2.2 Article 19 - Payments to Contractor

Under Article 19, paragraph 19.1 the sentence reading: "The OWNER will, within ten (10) days of presentation of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retainage", shall be changed to read: "The OWNER will, within thirty (30) days of presentation of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retainage."

In addition, the following shall be added to paragraph 19.1:

The establishment of an Escrow Account between the Owner and the successful bidder(s) for the retainage will be left to the sole discretion of the successful bidder(s).

2.3 Article 32 - Detailed Breakdown of Contract Amounts

Identified as Article 32, the following shall be included to the General Conditions:

The Contractor shall furnish, the Engineer reasonable facilities for obtaining such information as he may desire respecting the progress and execution of the work and the character of materials. The Contractor shall, upon request, furnish the Engineer with copies of expense bills for transportation charges, materials and equipment. In the event of cost-plus limited work as authorized in writing by the Owner, the Contractor shall submit daily payrolls and equipment ownership/rental charges in addition to the cost of materials.

Except in cases where unit prices form the basis of payment under the Contract, the Contractor shall, within ten (10) days of receipt of the Notice of Award, submit a complete breakdown of the Contract Amount showing the value assigned to each part of the work, including as a minimum labor, material, equipment, sub-contracts, mobilization, overhead and profit. Upon acceptance of the breakdown of the Contract amount by the Engineer, it shall be used as the basis for all Requests for Payment and Change Order negotiations as applicable.

3. Tentative Award of Contract

The Owner may elect to make tentative award of contract, pending the sale of bonds or the completion of other financing arrangements. In such event, and upon successful completion of the necessary arrangements to finance the cost of the project, the Owner and the successful bidder to whom the tentative award has been made shall enter into a written contract at the price stated in the proposal and as specified; provided that the elapsed time from the date of the tentative award shall not exceed the period as set forth in the proposal form. The time for execution is mutually agreeable to the Owner and the successful bidder.

4. Quality Control Plan

The Contractor shall provide and maintain an effective quality control program. This program shall establish a means to perform sufficient inspection and tests of conformance to applicable Specifications and Drawings with respect to the materials, workmanship, construction, finish, functional performance and identification. This control will be established for all construction. Copies of inspections, reports, and testing results shall be mailed to the Engineer's office by the Quality Control Organization through the Contractor. When submitted for the Engineer's records, the reports and/or test results shall bear the Contractor's certification that he has reviewed, checked and approved the reports and/or test results and that they are in conformance with the requirements of the Contract Documents.

The Contractor shall furnish the Engineer within thirty (30) days after receipt of the Notice to Proceed a quality control plan which shall include the procedures, instructions and reports to be used. This document will include as a minimum:

- A. The quality control organization;
- B. Authority and responsibilities of quality control personnel;
- C. Methods of quality control, including that for his Subcontractor's work;

- D. Test methods including, as specified, name of qualified testing laboratory to be used;
- E. Method of documenting quality control operation, inspection and testing.

5. Overtime Payment

All premium overtime expense incurred by the Engineer/Inspector and/or his representatives on account of the Contractor's construction forces working beyond forty (40) hours per week, Saturdays, Sundays and/or Holidays as scheduled by the Owner shall be paid by the Contractor to the Engineer. Payments shall be made monthly based on the Engineer's detailed invoice to the Contractor. If the Contractor fails to make any payments due the Engineer within thirty (30) days from the date of the Engineer's invoice, then the Engineer shall be entitled to interest at the rate of 1-1/2% per month (but not exceeding the maximum rate allowable by Indiana law) from said 30th day.

6. Authority and Duty of Resident Project Representatives (Inspectors)

The Resident Project Representatives employed by the Owner are stationed on the work to:

- A. Keep the Engineer/Owner informed as to the progress of the work and the manner in which it is being done.
- B. Report whenever it appears that the materials furnished and the work performed by the Contractor fail to fulfill the requirements of the Specifications and Contract.
- C. Call to the attention of the Contractor any deviation from or infringement upon the Plans and Specifications.
- D. Check and verify that Contractor is keeping and maintaining Project As-Built Drawings.

Resident Project Representatives shall be authorized to inspect all work done and materials furnished and to exercise such additional authority as may be delegated to them in writing by the Engineer. Such inspection may extend to all or any part of the work done and material furnished. They shall have authority to reject defective material and to suspend any work that is being done improperly, subject to the final decisions of the Engineer.

Such inspection shall not relieve the Contractor from any obligation to furnish acceptable materials or to perform all work strictly in accordance with the requirements of the Plans and Specifications.

Resident Project Representatives shall not be authorized to revoke, alter, enlarge, relax or release any requirements of the Specifications, nor to approve or accept any portion of the work, nor to issue instructions contrary to the Plans and Specifications. They shall, in no case act as foremen or perform other duties for the Contractor nor interfere with the management of the work by the latter. Any advice which inspectors may give the Contractors shall in no way be construed as binding the Engineer or the Owner in any way, or releasing the Contractor from the fulfillment of the terms of the Contract.

The Owner, the Engineer and his authorized representatives will at all times have access to the WORK, to determine if the WORK is proceeding in accordance with the Contract Documents. If in the opinion of the Owner, the Engineer and his authorized representatives, the WORK is not proceeding in accordance with the Contract Documents, or the Contractor is utilizing undesirable construction practices, the Owner, the Engineer and/or through his authorized representatives, may direct the Contractor to cease WORK and correct all defective work and undesirable construction practices. The Contractor will bear all expenses for correcting defective work, and will bear any and all monetary losses and expenses relating to and resulting from ceasing of WORK because of defective work. Such expenses to also include compensation to the Owner for non-productive inspection expenses during the time lost while correcting defective work, the Contractor will not be granted an extension of the project scheduled completion time.

7. Proposals for Equipment and Materials

Proposals for the various equipment and materials to be furnished and installed shall conform with the specifications for all bid items, with respect to general design, performance, materials of construction, workmanship, overall functions, testing and accessories.

Where the names of two (2) manufacturers are specifically mentioned in the Detailed Specifications and followed by "or equal", the bidders may bid on either of the two (2) named manufacturers or on any alternate proposal, equal or superior to the two (2) named manufacturers, provided that the "or equal" conforms with the requirements of these Contract Documents.

Whenever equipment other than that named specifically in the Specifications and shown on the Plans is proposed in the proposal, the Contractor shall include in his bid on such "or equal" equipment:

- A. The cost of redesign of any mechanical, electrical and/or structural changes necessary to make the "or equal" equipment to comply with the ratings, loadings, dimensions, etc., prescribed herein;
- and
- B. Any increase in the cost of structures, piping, electrical and/or mechanical appurtenances involved by the proposed "or equal" equipment.

8. Landmarks and Monuments

The Contractor, nor any of his employees, shall not molest or remove monuments or landmarks without the written consent of the Owner. Any monument or landmark so removed shall be replaced at the expense of the Contractor. The cost thereof shall be retained from the monies due or to become due the Contractor under this Contract.

9. Guaranty

In addition to all materials and workmanship, all sod, seed, trees, shrubs, bushes, flowers, etc., which are placed, sowed, planted or replanted by the Contractor to replace same destroyed or damaged by his operations, shall be guaranteed for a period of one year from the date of the Certificate of Substantial Completion of the work under this Contract.

Should any of the above die or fail to grow, it shall be replaced, resown, or replanted at no cost to the Owner.

10. Use of Chemicals

All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in conformance with instructions.

11. Definitions

In the case of this Project, the Owner is the Shafer-Freeman Lakes Environmental Conservation Corporation and the Engineer is Commonwealth Engineers, Inc., of Indianapolis, Indiana.

12. Insurance Coverage

The Contractor shall purchase and maintain such insurance coverage sufficiently broad to insure the Owner, the Engineer, their consultants and each of their officers, agents and employees as additional named insured under the requirements of Paragraph 21 of the General Conditions.

13. New Materials and Equipment

Unless otherwise specifically permitted by the Specifications, all material and equipment used on this Project shall be new and un-used.

14. Differing Site Conditions Notification

The Contractor shall promptly and before such conditions are disturbed, notify the recipient in writing. The recipient in this case shall mean the Owner not the Engineer.

15. Substantial Completion and Liquidated Damages

The time for completion and liquidated damages is defined in Section 15 of the General Conditions. For purposes of clarification, liquidated damages will begin if the work is not fully complete within the Contract time. Issuance of a Certificate of Substantial Completion with items of work still outstanding will not stop liquidated damages.

16. Revisions to Construction Schedule and Time Extension Requests

The Contractor shall submit to the Engineer with each monthly progress payment request an updated construction schedule for the Engineer's review and approval. In addition and when applicable, the Contractor shall also submit with each monthly progress payment request any and all documentation necessary for any time extension that may be justified in the Contractor's opinion and due to conditions encountered during the period for which the claim is being filed. A Change Order will then be prepared for this claim as soon as it is approved by the Owner and Engineer.

Requests for time extensions made after the above specified period and not reflected in the updated construction schedules previously submitted shall not be considered.

17. Withholding of Construction Payments

The Engineer may recommend to the Owner and the Owner may withhold, or on account of subsequently discovered evidence, nullify the whole or part of any estimate to such extent as may be necessary to protect the Owner from loss on account of:

- a. Defective work not remedied;
- b. Claims filed or reasonable evidence indicating probability of the filing of claims;
- c. Failure of the Contractor to make payments properly to sub-contractors or material suppliers for which the Contractor has been paid by the Owner;
- d. A reasonable doubt that the Contract can be completed for the balance then unpaid;
- e. Damage to another Contractor;
- f. Failure of the Contractor to keep his work progressing in accordance with his time schedule;
- g. Performing of work in violation of the terms of the Contract.

18. Night and Sunday Work

No night or Sunday work requiring the presence of the Engineer or the Resident Project Representative will be permitted unless the Engineer has been given seven (7) days written notice. The Contractor will be responsible pursuant to Section 6 of these Special Provisions for all overtime (premium) expense incurred by the Engineer for night or Sunday work.

19. Established Construction Techniques

All construction techniques and specialized equipment used to complete the work under this Contract shall be only those established as suitable and effective by extensive prior use in similar work. Unproven or experimental techniques shall be allowed only with written permission from the Engineer. Upon receipt of written request from the Engineer, the Contractor shall submit detailed documentation to establish the qualifications of any technique or specialized equipment being employed to complete the work. Minimum documentation shall include not less than three (3) references where the procedure has been employed in similar work and under similar circumstances. Each reference shall include the location, date, project owners name and address and the name and telephone number of a person to contact for a technical reference. Techniques and/or equipment adjudged by the Engineer to be unsuitable and/or unproven shall be immediately discontinued. Work performed utilizing these techniques shall be reworked by the Contractor at his expense and as directed by the Engineer.

20. Shop Drawings

In addition to the requirements relative to Shop Drawings as contained in Paragraph 5 of the General Conditions and Paragraph 16 of the General Construction Specifications, the Contractor shall also meet the following requirements:

20.1 Shop Drawing Submission

Within ten (10) days after being notified by the Engineer as to the Shop Drawings required for the Project, the Contractor shall submit to the Engineer a preliminary schedule of Shop Drawing submissions.

The finalized Shop Drawing Schedule shall be submitted to the Engineer within ten (10) days after the Contractor has received the Engineer's comments relative to the preliminary schedule.

20.2 Shop Drawings

After checking and verifying all field measurements and after complying with the applicable procedures previously specified, the Contractor shall submit to the Engineer for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see 20.1 above), six (6) copies of all Shop Drawings, which will bear a stamp or specific written indication that the Contractor has satisfied the Contractor's responsibilities under the Contract Documents with respect to review of the submission. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable the Engineer to review the information as required.

20.2.1 Before submission of each Shop Drawing or sample, Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the work and the Contract Documents.

20.2.2 At the time of each submission, Contractor shall give Engineer specific written notice of each variation that the Shop Drawings or samples may have from the requirements of Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

Engineer will review and approve with reasonable promptness Shop Drawings and samples; but Engineer's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of separate items as such will not indicate approval of the assembly in which the item functions. Contractor shall make corrections required by Engineer, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

Engineer's review and approval of Shop Drawings or samples shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called the Engineer's attention to each such variation at the time of submission as required by paragraph 20.2.2 and Engineer has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by Engineer relieve Contractor from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 20.2.1.

Where a Shop Drawing or sample is required by the Specifications, any related work performed prior to Engineer's review and approval of the pertinent submission will be the sole expense and responsibility of Contractor.

21. Hazard Communication Standard

Pursuant to the Code of Federal Regulations, 29 CFR Part 1926, as may be amended, all Contractors, Subcontractors and materials suppliers on this Project shall provide access to all persons on the job site at all times, the Material Safety Data Sheets (MSDS) for all hazards of all chemicals per the Federal Regulations.

In addition, contractors, sub-contractors and material suppliers shall provide training to their employees on the MSDS pursuant to the Federal Regulations.

22. Excavation Safety Requirements

It shall be the duty and responsibility of the Contractor and all of its Subcontractors to be familiar and comply with all requirements of Public Law 91-596 29 U.S.C., Sections 651 et. seq., the Occupational Safety and Health Act of 1970 (OSHA) and all amendments thereto and to enforce and comply with all of the provisions of the Act. In addition and as required by Indiana State Law, HB 2071, Section 14. of IC 4-13.6-5-12, the Contractor and all of its Subcontractors shall comply with Subpart P of 29 CFR 1926 dated October 31, 1989 as may be amended.

Costs of all Excavation Protection shall be included in the Bid.

23. Products in Contact with Potable Water

Any treatment chemical, any material used in the manufacture of public water system components or appurtenances; any pipe, storage tank, valve, fixture or other materials which come into contact with water intended for use in a public water system shall be certified for conformance to ANSI and/or NSF 60 & 61. Any products not certified for compliance to ANSI/NSF 60 & 61 but appearing on the Advisory List published by the U.S. EPA shall not be used.

24. Project Site Erosion Control

The Contractor shall be responsible to comply with all aspects of 327 IAC 15-5, Rule 5, "Storm Water Run-Off Associated with Construction Activity". The Contractor shall submit all necessary fees and documents to the Indiana Department of Environmental Management (IDEM) prior to any construction activity. The Contractor shall be responsible for compliance with this Law throughout the construction period and shall pay any and all fines resulting from any violation, suit or penalty for non-compliance.

25. Confined Space Access

For projects which include construction activities within "confined spaces" as defined in Title 29 CFR Part 1926.21(b)(6), the Contractor is hereby advised that he must fully comply with all pertinent requirements as delineated in this regulation and as interpreted by OSHA. The Contractor shall have and maintain all necessary safety and testing equipment at all times during the course of the construction activity. In addition, it shall be the Contractor's responsibility to make this equipment available for use by the Owner or the Owner's Representative on the project site. If the Owner or the Owner's Representative requires

the use of this equipment during the course of observing or verifying the construction, it shall be made available in a timely fashion. If the Owner or the Owner's Representative is unable to observe or verify a portion of the construction due to a lack of the necessary safety or testing equipment, any resulting delays and/or expenses shall be the responsibility of the Contractor.

This equipment shall include a gas monitor capable of detecting oxygen, combustibles, and toxics including carbon monoxide and hydrogen sulfide. A metal oxide (broad based) sensor may be used in lieu of the individual carbon monoxide and hydrogen sulfide sensors. Contractor shall provide gas monitor calibration certifications to Engineer to verify proper maintenance.

26. Wage Scale

This Project has no established wage scales.

27. Permits

The following list of Permits (to be provided by Addendum) are to be incorporated into these Special Provisions to insure that all requirements of the Permits are known by the Contractor prior to bidding. Any provision of these Permits which conflicts with the Plans and Specifications must be adhered to.

- ▶ IDNR
- ▶ USCOE Section 404

28. Adverse Weather Delays

Unusually severe weather must actually cause a delay to the completion of the project to be considered as such. The delay must be beyond the control and without the fault or negligence of the Contractor. The following schedule of monthly anticipated adverse weather delays is based on the National Weather Service or similar data for the project area and will constitute the baseline for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

Monthly Anticipated Adverse Weather Delay
Work Days Based On (5) Day Work Week

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(14)	(9)	(7)	(5)	(6)	(4)	(4)	(4)	(4)	(4)	(5)	(9)

Upon acknowledgment of the Notice To Proceed and continuing throughout the contract, the Contractor shall record the occurrence of adverse weather and the resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in the previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated herein, the Owner may convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days.

29. Payment to Contractor

Partial payments will be made to the Contractor as specified in Part 3 "General Conditions", page GC-10, item 19 "Payment to Contractor". In addition to the requirements of the General Conditions for partial payment to the Contractor, the Contractor shall be required to submit a copy of the partial payment request to the Contractor's surety for their review, not less than 10 days prior to the Owner's approval of the pay request, indicating a request for payment for work which may not have been tested in accordance with final acceptance procedures for said work. The Contractor shall include a statement on each monthly partial payment request indicating the pay request has been sent to the Contractor's surety and the Contractor shall attest to this by signing the pay request.

PART 8

DETAILED SPECIFICATIONS

PART 8

DETAILED SPECIFICATIONS

AREA 1: HONEY CREEK

DIVISION "B" - SEDIMENT PLACEMENT SITE CONTRACT

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SECTION 0

GENERAL

DETAILED SPECIFICATIONS

1. GENERAL

- 1.01 Scope of Detailed Specifications - The Detailed Specifications part of the Contract describes equipment, material, labor, services, and other provisions of the Contract which must be provided and met by the Contractor and which supersede the General Construction Specifications, Part 5, and the Workmanship and Materials Specifications, Part 6, of the Contract where the provisions of these Parts are in conflict.
- 1.02 Scope of this Section - This Section contains provisions which are applicable to all Detailed Specifications or are of a general nature.
- 1.03 Contractor's Responsibility - The Contractor shall furnish all materials, labor and equipment for the Work described under this Specification.
- 1.04 Method of Construction - Due to the nature of this project a hydraulic dredging method of lake excavation has been assumed for these Detailed Specifications. The contractor will be responsible for working under these conditions and for supplying and installing materials by dredge, barge, crane, conveyor etc. or whatever will be needed to complete the project. It must be recognized that draining portions of tributary lake areas has been considered, but due to resulting wet soil conditions and the uncertain drying time needed, it should be recognized that the use of "heavy-highway" type construction equipment may be limited.
- 1.05 Payment - The lump sum prices stated in the Contract for the respective Items shall be payment in full for the completion of all work specified and described to be included in the respective Items, complete and ready for use and operation, including testing, as shown on the plans and as specified.

2. CONTINUITY OF PUBLIC SERVICES

- 2.01 The Project may involve the excavation and placement of spoil material close to existing utilities. Certain portions of the work must be accomplished within rights-of-way, and traffic flow must be maintained. Therefore, it is necessary that all work be performed in such a manner so as to provide to the greatest extent reasonably possible, a continuous service of potable water and other utilities, and the flow of traffic on public streets. The Contractor shall be fully responsible for, and shall provide, any and all temporary piping, pumping, controls, electrical, containment and transportation equipment, and other equipment and work so as to maintain these public transportation and utility services. This may include but not be limited to the installation of temporary culvert structures.

3. NOTICE OF STREET CLOSINGS

- 3.01 Contractor shall give Engineer and Owner and the respective utility or authority notice at least seven (7) days prior to the temporary discontinuation of service, or temporary closing of all or parts of streets. Such notice shall specify the locations of temporary service discontinuation or street work, the estimated time that the work will require to complete, and the extent, whether partial or complete, that any streets are anticipated to be closed.

4. COMPLETION OF WORK AND LIQUIDATED DAMAGES

- 4.01 **Scope** - This Section defines the Time for Completion, also called Contract Time, and the Liquidated Damages under the Contract Documents.

4.02 Time for Completion and Liquidated Damages

- a. Time for Completion of Contract - The Contractor shall substantially complete the work and have the work substantially complete and ready for use in conformance with Part 9, "Bid Proposal Documents".
- b. Time is of the Essence - It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion of the work as specified in the Contract Documents are essential conditions of this Agreement.
- c. Rate of Progress - The Contractor agrees that said work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will insure full completion thereof within the contract time.
- d. Liquidated Damages - If the Contractor shall neglect, fail or refuse to complete the work within the Contract Time, or any proper extension thereof granted by the Owner, then the Contractor does agree, as a part consideration for the awarding of the Contract Documents, to pay to the Owner the amount specified in the Agreement, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every day that the Contractor shall be in default after the expiration of the Contract Time. The amount of liquidated damages specified in the Agreement is **Five Hundred Dollars (\$500.00)** for each calendar day that the work remains uncompleted after the time stipulated for completion in these Contract Documents.

The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages which the Owner would sustain and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

- e. Exceptions to Liquidated Damages Provision - It is further agreed that time is of the essence of each and every portion of this Agreement and of the

specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where, under the Contract Documents an additional time is allowed for the completion of any work, the new time limit fixed by such extensions shall be the essence of this Agreement. Provided, that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; provided further, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

1. To any preference, priority or allocation order not specified in the Contract Documents and duly issued by any governmental entity;
2. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather, taking into consideration the climatic range of the preceding ten (10) year period; or
3. To any delays of subcontractors or suppliers occasioned solely by any of the causes specified in 1. and 2. of this subsection; and
4. The event directly caused the delay and the delay occurred despite the Contractor's best efforts to reorganize his work effort to avoid the delay.

Provide further, that the Contractor shall, within ten (10) days from the beginning of such delay, unless the Owner shall grant in writing a further period of time prior to the tenth (10th) day after the beginning of such delay, notify the Owner, in writing, of the causes of the delay. Thereafter, Owner shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

5. USE OF EASEMENTS

- 5.01 Notwithstanding, anything to the contrary in these Contract Documents, the Contractor shall limit its work in and around easements to comply with those specific rights provided under the easements. Copies of easements are available from the Owner upon request. In the event Owner or the owner of the land on which the easement exists is damaged by Contractor's work in or around the easement, Contractor shall be fully responsible for restitution for the damage.

6. PRODUCT

- 6.01 General** - Temporary fittings, fixtures, products, labor and workmanship necessary under this specification to accomplish testing shall meet all requirements of applicable specifications under this Contract.

7. PROJECT FIRST AID FACILITIES

- 7.01 The Contractor shall comply with the requirements for all local, State and Federal agencies having jurisdiction for temporary first aid facilities for construction sites.
- 7.02 The Contractor shall insure the availability of medical personnel for advice and consultation on matters of occupational health.
- 7.03 The Contractor shall make provisions prior to commencement of the work for prompt medical attention in case of serious injury.
- 7.04 An area that, when needed, can be segregated from other activities shall be designated specifically as a first aid station, and equipped as required to fulfill these requirements.
- 7.05 In the absence of an infirmary, clinic, hospital, or physician that is reasonably accessible in terms of time and distance to the work site, which is available for the treatment of injured employees, a person who has a valid certificate in first aid training from the U.S. Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentary evidence, shall be available at the work site to render first aid.
- 7.06 First aid supplies approved by the consulting physician shall be easily accessible when required.
- 7.07 The first aid kit shall consist of materials approved by the consulting physician in a weatherproof container with individual sealed packages for each type of item. The contents of the first aid kit shall be checked by the Contractor at least weekly and at the time the expended items are to be replaced.
- 7.08 Proper equipment for prompt transportation of the injured person to a physician or hospital, or a communication system for contacting necessary ambulance service, will be provided.
- 7.09 The telephone numbers of the physicians, hospital, or ambulances shall be conspicuously posted.

8. INDIANA DEPARTMENT OF TRANSPORTATION (INDOT) STANDARDS

- 8.01 Miscellaneous INDOT Standards and Detailed Specifications are to be used in conjunction with the contract plans. The INDOT specifications are intended to be used only for material and installation specifications and not to supersede contract language or methods of measurement or payment described elsewhere in these specifications.

9. **COORDINATION OF WORK WITH OTHER DIVISION CONTRACTORS**

- 9.01 General. Since the project will consist of two (2) divisions, Division A, Dredging Contract and Division B, Sediment Placement and Dewatering Site Contract, each contractor shall coordinate their work with each other.
- 9.02 It shall be understood that the sediment placement site must be completed before dredge pumping operations can begin.
- 9.03 Due to the limited rate of settling in the dewatering basin, the Contractor under the Division A Contract shall account for the limitations on how much slurry can be pumped into the dewatering basin. This will require that the dredger also maintain an optimal dredging efficiency in order to minimize the amount of water introduced into the dredge pump.
- 9.04 The Division A Contractor shall account for weather limitations that may be placed on the Division B Contractor. However, the Division B Contractor shall also account for the historic average number of adverse weather days for the project area. Refer to Special Provisions Part 28 "Adverse Weather Delays".

SECTION 1

MOBILIZATION, BOND, AND OTHER

1. GENERAL

1.1 Scope

The Contractor shall furnish all labor, equipment and materials necessary for mobilization and demobilization to the project site(s) and for maintaining written progress reports for work completed each day as required by the Owner. This work shall also include the expense related to the purchase of required insurance and bonds and cost for pre-construction audio-video survey. In addition, the cost for all work items not specifically included under the other pay items shall be included in this Section.

1.2 Payment

Payment shall be a lump sum for the work specified in this section as well as for all work items not specifically included under other pay items.

2. PRODUCT

2.1 Progress Reports

The Contractor shall maintain a written daily progress report of work performed. The purpose of the progress report is for tracking the depth and the approximate location of sediment that is dredged and placed each day. Work will be inspected by the Owner from time to time and compared with work completed as noted in the daily progress report. A sample of this report is included at the end of this section.

2.2 Insurance and Bonds

Required insurance and bonds shall be as set forth in Part 2 - "Information for Bidders", Part 3 - "General Conditions", and Part 7 - "Special Provisions".

2.3 Pre-Construction Audio-Video Survey

A. General

1. Prior to construction, the Contractor shall tape all visible construction areas which will be disturbed by the Contractor to document the condition of the area. The purpose is to establish conditions prior to construction.
2. The product shall be high quality audio and video tape. The video portion shall present bright, sharp, clear pictures with accurate colors. The picture shall be free from distortion, tearing, rolls or other picture imperfection. The audio portion shall be proper volume, clarity and free of distortion. The audio commentary shall be precise and concise explanatory notes.

B. Camera

Where the area to be taped is accessible by conventional wheeled vehicles, the video camera shall have a horizontal resolution of 500 lines at center. For areas non-accessible by conventional vehicles, the color video camera shall have a horizontal resolution of at least 300 lines at center. The tapes shall be high quality color VHS.

2.3 Monitoring and Positioning Equipment

As part of this item, dredging or other excavation equipment should consider appropriate instrumentation including sensors, indicators and controllers. In addition to instrumentation, the contractor shall utilize a horizontal positioning system for locating all dredging equipment and depth measurements.

3. EXECUTION

3.1.1 Audio

The audio part of the tape shall provide a precise and concise summary. An audio summary shall be provided at the beginning of each tape, at each street, and at intervals of not more than 100 lineal feet. Audio summary shall include tape number, job title, job location, positional location, date and time, weather and any other notable condition.

3.1.2 Coverage

The recordings shall include coverage of all surface features located along the main route. The tape coverage shall include all existing cross streets, driveways, sidewalks, curbs, ditches, shrubbery or other structures located along the route.

3.1.3 Taping Procedures

- A. The rate of speed of the vehicle used for taping shall not exceed 48 feet per minute. Camera elevation from ground shall be 12 feet or greater.
- B. Recording shall only be done during periods of sufficient sunlight. No recording shall be done during periods of significant precipitation, mist or fog.
- C. The operator shall have had experience video documenting at least 50 miles of pre-construction work.
- D. The recording shall be completed prior to the start of construction and the placement of any construction materials or equipment on the proposed site. However, work shall not proceed commencement of work by more than seven (7) weeks.

3.1.4 Delivery

- A. The video tapes shall be delivered to the Owner prior to the start of construction. Any recordings not conforming to the specifications may be rejected with retaping to be done at no additional cost to the Owner.
- B. The video tapes shall be delivered in storage cases. Each tape shall be properly labeled. An index shall describe the contents of each tape.

3.2.1 Position Monitoring

- A. The contractor shall utilize plan verifiable reference points shown on the plans. These shall include points around the proposed excavation areas for sediment trap construction and also points around placement and containment areas.
- B. Positioning information shall be taken and recorded no less than four (4) times per day for both dredging equipment and that piping and/or equipment located on the four (4) times per day for the sediment placement site. This shall include positioning information prior to beginning and ending dredging operations each day, plus two other randomly times as may be selected by the Owner. This information is to be used for confirming work completed to date for partial pay estimates and for inspection purposes required by the Owner. All progress report records are to be submitted to the Owner on a weekly basis.
- C. Acoustic sounding (Sonar) devices with printout capabilities may be used for establishing both before and after dredging depths. This information may also be taken when positioning information is acquired. Calibration of these devices will also be required. All records are to be submitted to the Owner on a weekly basis.
- D. Positioning and sounding information shall be provided to outline the limits of excavation performed and shall be verifiable by the Owner.

SEDIMENT PLACEMENT SITE EARTHWORK

- 1.01 The Contractor shall furnish all labor, materials, equipment, tools, pumps, and other equipment, and shall do all work necessary for all excavations and embankments, backfilling, final grading and other work as required for the construction and management of a sediment placement and dewatering site as shown on the plans and as specified, except work specifically included under other Contract Items.
- 1.02 The Contractor shall utilize those site(s) selected by the Owner for sediment placement and containment areas unless they have written authorization to place disposal material on other lands that are upland sites and do not cause regulatory violations.

Trap Area

a. Keans Bay ▶ Spark's Property

- The maximum effluent level of suspended solids for this project is 2 grams per liter.

- ## 2. WORK INCLUDED

- DS-H-B-2-1**

be done or temporary access is required; protection of all existing and new structures, piping, conduits, subsoil and topsoil stockpiling, draining, pumping, handling and disposal of water from the excavations; trenching, drain tile installations, backfilling; final grading; providing topsoil over final graded areas; and other operations as specified and required to complete the earthwork.

- 2.02 The Division A, Dredging Contractor will be responsible for installing all pressurized inflow discharge pipelines up to the point of discharge in a dewatering basin. It will be the responsibility of the Contractor under this, Division B Contract, to install all on-site dewatering structures and an outflow discharge pipeline back to the waters edge of the lake as shown on the plans. The Division A, Dredging Contractor will be responsible for the outlet discharge pipeline within the lake area from the waters edge through the lake. Both contractors shall be responsible for coordinating the connections between each pipeline.
- 2.03 Work shall also include daily monitoring and weekly sampling of the Total Suspended Solids in the effluent.
- 2.04 Excavated materials to be later used for fill or filler topsoil shall be stockpiled and used to make the fills and embankments as shown on the plans and in compliance with Section WM-3 of the Workmanship and Materials Specifications. Backfilling shall be done in a manner to avoid any undue structural loading on structures. Stockpiles shall be located so as to avoid interference with access to project areas and to least interfere with other contractors performing work on behalf of the Owner in the same vicinity and as approved by the Engineer.
- 2.05 The work shall be performed in such a manner so as to prevent damage to existing structures, including piping, that are to be retained. Soil boring logs and geotechnical recommendations are available for review.
- 2.06 In the event of a surplus of excavated material which is not needed for backfilling, grading or filling a disposal site, the Contractor shall work with the Owner to dispose of such surplus material in other acceptable sites. For this project, a primary site has been identified.

3. SUBSURFACE CONDITIONS

- 3.01 Borings and other investigations that have been made for material to be dredged are included at the end of this section. The information given in these logs applies only to conditions encountered at the indicated locations and to the depths shown. The Contractor shall examine the site personally and make such additional investigations as he may deem necessary for estimating costs, planning and execution of the work.
- 3.02 No soil borings have been made for sediment placement sites. Therefore, it will be the Contractor's responsibility to undertake soils investigations prior to bidding.

4. EXCAVATION AND EMBANKMENT

- 4.01 The excavation and embankment construction shall be outlined in the Contractor's Plan of Operation to be submitted to the Owner prior to initiation of the actual work.

The placement of sediment for this project is to be by the confined disposal method. Hydraulically pumped material will be discharged into the sediment placement site by an overland inflow discharge pipeline.

- 4.02 Special attention shall be given to protecting and maintaining existing trees and shrubbery, including key shade, and visual resources. Trees that, in the Contractor's and Owner's opinion, must be removed shall first be photographed and marked by the contractor for verification by the Owner. Removal of any trees and brush shall be done in such a manner as to avoid damage to other trees and property.
- 4.03 If excavated areas are located in cultivated areas or in areas of high value land, trees, logs, and all combustible material resulting from the clearing and snagging operations shall be disposed of in approved areas out of the project limits as specified for the project. All burning shall conform to regulations in effect in the area. In other areas, such as woodland or rangeland, where burning is prohibited, material shall be removed from the site. Residue from burning and noncombustible material shall be removed from the site. All buried material shall have an adequate earth cover to permit land use.
- 4.04 Vegetation shall be established on all disturbed areas such as channel slopes, berms, spoil, placement and other areas except when bank materials or land use conditions are such that vegetation is impractical and authorized by the Owner. Disturbed areas are to be final graded and seeded as soon as possible after exposure. Gullied and uneven areas will be smoothed before attempting to prepare seedbed. Upon finish grading of work area, the Contractor shall permanently seed and stabilize all final grade areas above the water line (see Detailed Section 9, Seeding & Sodding).
- 4.05 Prior to filling a sediment placement site, erosion control measures shall be installed to control erosion and prevent sediment laden water from exiting the site. This shall include, but not be limited to, the installations of temporary earthen berms, silt fences, straw bales, filter curtains, riprap, drainage piping, catch basins, and other items that are needed to control sediment.
- 4.06 Silt fences shall be used by the Contractor to retain sediment from sloping disturbed areas. Fence shall approximately follow the contour of the land and be located at least ten (10) feet from toe of slope to provide broad, shallow sediment pool. Access to the area shall be provided for sediment clean-out. 2 x 2 in. hardwood posts (or steel fence posts) with a maximum of eight (8) foot spacing shall be used. Support wire (if needed) shall be 14 gauge, six (6) inch mesh wire fence. Fence fabric shall be either woven or non-woven, geotextile fabric with minimum 85% filtering efficiency. The fence fabric shall contain UV inhibitors and stabilizers to insure six (6) month minimum life at temperatures between 0° - 120°F. The fence shall be installed per the manufacturer's recommendations to insure acceptable performance. When work is completed at the disposal site with an acceptable ground cover, the silt fence may be removed.
- 4.07 Straw bale dams may be used by the Contractor to retain sediment from sloping disturbed areas where deemed appropriate. Bales should be located at least 10 feet from toe of slope. Bales shall be anchored by two (2) 36-inch (minimum) long

steel rebars or 2 x 2 inch hardwood stakes driven through each bale until nearly flush with top of a bale. Bales shall be inspected by the Contractor after each storm event and any sediment deposits around bales should be promptly removed when work is completed with an acceptable ground cover at the disposal site.

- 4.08 The Contractor shall also prevent any wind-borne soil particles, which could create a health and/or visibility hazard from leaving the disposal sites. The Contractor shall apply an approved dust preventative, as necessary, to avoid and eliminate a health and/or visibility hazard due to wind-borne soil particles. The dust preventative must be approved by both the Owner and Engineer prior to use.
- 4.09 All sites to be filled shall be stripped of topsoil and subsoil, which shall be stockpiled separately for ultimate placement over areas that are filled, final graded and seeded.
- 4.10 Earth dike construction shall be undertaken after all topsoil has been stripped and a minimum 9 foot wide by 3 foot deep key trench constructed as indicated in the plans. The material used for the exterior dikes shall be relatively impervious using native clays found on the site or hauled in from an outside source. Internal dikes may be constructed using either native clays or noncohesive material such as sand. Should hydraulically pumped material contain high levels of noncohesive, well draining material, they may also be used for the construction of internal dikes. Earth dikes shall have a minimum top width of 5 feet for internal dikes and 10 feet minimum for exterior dikes, except where shown otherwise on the plans for access haul roads.

The dewatering side faces of dikes shall be no steeper than a 3 horizontal to 1 vertical sideslope unless shown otherwise on the plans. The exterior face of dikes shall be no steeper than a 5 horizontal to 1 vertical sideslope or as shown otherwise on the plans.
- 4.11 Containment dikes are to be constructed with compactive efforts of 90 percent (Standard Proctor) or better. Dikes are to be constructed from native soils found on the site. The placement of the dike shall be in general conformance with the plans except where more than one dike is used internally. If utilized, temporary internal dikes used for the separation of material shall be provided with interconnecting overflow weirs stabilized with an armor layer or geotextile. If necessary, the Contractor may be required to use plastic sheeting in order to control seepage from the containment area(s).
- 4.12 The final graded areas of all exposed ground surfaces, including the slopes of embankments shall be covered to a depth of 3 to 4 inches with topsoil which is suitable for growing lawn grass. The Contractor shall strip and stockpile available topsoil from the areas to be covered with embankments as a source of suitable material. The topsoil shall consist of loose, friable topsoil, free from subsoil, debris and stones.

5. OPERATION AND MANAGEMENT OF DEWATERING SITE

- 5.01 The effectiveness of dewatering hydraulically pumped sediments is dependent upon the physical material being pumped into the dewatering facility and the amount of water being pumped with the dredged sediments. It is also dependent upon the effectiveness of the operator of the dewatering facility.
- 5.02 A changeable stop plate type weir structure is to be built as part of the Division B contract. Plans indicate that this structure is to be built by masonry construction. This is to help simplify construction; however, another type of structure may be considered by the Engineer as long as it is durable and provides at least the same weir length. The weir height must also be variable. The weir stop plates shall be adjusted as necessary to maximize settlement of the sediment and as determined by quality control testing for Total Suspended Solids.
- 5.03 In order to better manage and facilitate improved dewatering, both Division A and B Contractors will be required to work together to construct additional internal dikes or separate material from the dredging operation based on the composition of the sediment. For example, some sediments may consist of non-cohesive well draining sand, whereas some sediments may contain more cohesive silts and clays which take longer to settle out.
- 5.04 In order to assist the Division B Contractor with the operation and maintenance of the sediment placement site, Chapter 7 of the U.S. Army Corps of Engineers manual EM 1110-2-5027, titled Confined Disposal of Dredged Material is included after the soils report following this section. This is not intended to specify the means and/or methods to be used by the Contractor, but is intended to be a reference tool to assist the Contractor as needed.
- 5.05 Disposal of dredged material in wetlands, forested riparian areas, or other high-quality habitats should be avoided. Disposal in wetlands or other waters may require a permit from the U.S. Army Corps of Engineers, pursuant to Section 404 of the Clean Air Act.

6. OPTIMIZING DEWATERING AND COMPACTION

- 6.01 The Contractor shall be responsible for adequately dewatering the contained sediment and shall compact the material to a density of no less than 80 percent (Standard Proctor) prior to completion of the contract.
- 6.02 Although there are several methods available for dewatering sediment, the following activities are presented for guidance:
 - A. Material may be separated into coarse and fine grained materials. Coarser materials can be dewatered more efficiently.
 - B. The surface water should be released as soon as possible to facilitate drying.
 - C. Maximize the length of time the material is exposed to the atmosphere, especially when evaporating conditions are most favorable.

- D. Place the material in thin lifts before placing subsequent lifts.
- E. Construct more than one dewatering sub-basin in order to allow for longer drying times in other basins where lifts have been placed.
- F. The use of vegetation with high transpiration ratios have been shown to be effective in completed areas
- G. Internal vee type trenching leading to outlets can be used. After drying, sand or gravel can be added to the trenches prior to adding subsequent lifts in order to act as underdrains.
- H. A collector pipeline underdrain or granular underdrains.

7. QUALITY CONTROL

- 7.01 In order to assure that the effluent being discharged back to the lake will be relatively free of excessive sediment, a system of measuring the amount of Total Suspended Solids (TSS) in the effluent is required. As stated earlier, **the maximum effluent level of suspended solids for this project is 2 grams per liter.** Since the TSS can vary from week to week, a composite sample of the effluent will be required no less than each week by the Division B Contractor. In addition, daily monitoring of the turbidity will be required. All results must be shown on the referenced progress reports. Should sampling indicate an unsatisfactory effluent, both the Owner and the Division A, Dredging Contractor shall be notified.
- 7.02 A composite sample is a single sample prepared by combining or compositing a number of grab samples within a given amount of time (typically a 24 hour period). The purpose is to provide information on the average characteristics of the sample over the given time. For this project, a total 1.0 gallon (4.0 L) sample will be required. The Contractor shall plan to take no less than one (1) representative grab sample each day in order to compile no less than a weekly composite sample.
- 7.03 The Division B Contractor shall contract with an independent testing laboratory who will perform the actual test for Total Suspended Solids and report the results to the Owner as soon as the information becomes available.

8. AS-BUILT CROSS SECTIONS

The Contractor shall cross section the final ground contours of all disposal and containment areas at no less than a 50 foot interval grid and submit this information to the Owner with a layout plan identifying the grid layout and tied to the original plan topographic and elevation datum.

9. PAYMENT

- 9.01 Payment for sediment placement site earthwork shall be made on a lump sum basis. Payment under this section shall include all excavations, embankments, labor, site preparation, grading and seeding, dewatering and drainage structures, erosion control, quality control and any other ancillary costs to complete the section.
- 9.02 The cost of transporting excavated materials from excavations to disposal areas or to points of final use, including stockpiling and rehandling, if required, and of disposing of all excavated materials that are wasted, as provided in this section, shall be included in the total bid.

SOILS BORINGS

PREPARED BY:
ALT & WITZIG ENGINEERING, INC.
GEOTECHNICAL DIVISION
PROJECT NO: S5452

PREPARED FOR:
COMMONWEALTH ENGINEERS, INC.
INDIANAPOLIS, INDIANA

AUGUST 31, 1995



Alt & Witzig Engineering, Inc.

3405 W. 96th Street • Indianapolis, Indiana 46268

(317) 875-7000 • Fax (317) 876-3705

August 31, 1995

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, Indiana 46237
ATTN: Mr. Roger Kottlowski

RE: Subsurface Investigation
Lake Shafer Enhancement Project
Monticello, Indiana
Alt & Witzig File: S5452

Gentlemen:

Pursuant to your request, the following report and lab data is submitted for the subsurface investigation for the proposed Lake Shafer Enhancement Project.

A subsurface investigation was performed at this site. The purpose of the investigation was to evaluate the soil conditions and bedrock depth with regard to the tributary bay sediment basins.

The boring logs were performed by hand due to the inaccessibility of the sites. Exceptions were borings SB-3K, SB-2H, and SB-4H which were drilled with a conventional truck mounted drill rig. The logs contain descriptions of the soils encountered, consistencies based on field observations, and any other note worthy observations made during the field and laboratory phase of this project.

The surface elevations noted on the boring logs were interpolated from a topographic survey provided by Commonwealth Engineers, Inc. They are presumed accurate to within +/- 1 foot.

None of our field borings encountered bedrock within the depth of the respective borings. However, borings SB-3K, and SB-2H encountered layers of large cobbles at depths ranging from ten (10) to fifteen (15) feet below grade. Some difficulties may be encountered during sheet pile driving if these cobble/rock layers are encountered.

Commonwealth Engineers, Inc.

August 31, 1995

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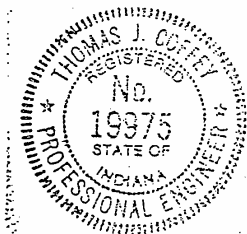
Often, because of design and construction details which occur on a project, questions arise concerning the soils conditions. If we can give further service in these matters, please contact us at your convenience.

Very truly yours,

ALT & WITZIG ENGINEERING, INC.

John Winstanley
John Winstanley
Project Engineer

Thomas J. Coffey
Thomas J. Coffey P.E.





CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-1K
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.
 Date Completed 8/23/95 Hammer Drop _____ in.
 Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Quartz Unconfined Compressive Strength	Pc-ter Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 92.4												
87.4	WATER	5.0	5										Keans Bay
84.4	Gray to Black Sandy SILT with some Organics, leaves wood	8.0											Very Soft Deposit
82.4	Gray to Black Sandy SILT with trace of Organics, Gravel	10.0	10										Soil Contained Air, (Methane)
80.4	Gray to Black Fine SAND with Silt	12.0											Soft to Medium Silt Deposit
	Boring terminated at 12.0 feet.												Loose to Medium Dense

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

X At Completion _____ ft.
 X After _____ hours _____ ft.
 O Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-2K
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.
 Date Completed 8/23/95 Hammer Drop _____ in.
 Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

Date Started	8/23/95	Hammer Wt.		lbs.
Date Completed	8/23/95	Hammer Drop		in.
Boring Method	HSA	Spoon Sampler OD		in.

STRATA ELEV.	SOIL CLASSIFICATION		Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tst Unconfined Compressive Strength	PP-tst Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 92.4												
89.4	WATER		3.0										Keans Bay Very Soft Deposit, No Resistance
87.4	Black SILT with trace of Sand and some Organic matter		5.0	5									
85.4	Gray to Black SILT (Soft to Medium Stiff)		7.0										
83.4	Gray Very Fine Silty SAND (Medium Dense)		9.0										
	Boring terminated at 9.0 feet.												

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion _____ ft.
 ✓ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-3K
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-taf Unconfined Compressive Strength	PP-taf Pocket Penetrometer	Moisture Content %	Remarks
92.1	Brown Clayey SILT with a trace of Organics (topsoil)	0.3										
				1	SS			12				
	Gray sandy SILT with Organics		5	2	SS			8				
				3	SS			20				
82.9		9.5										
82.4	Cobbles	10.0	10	4	SS			50/3				
	Gray Sandy Silty CLAY with Gravel											
			15	5	SS			18				
76.4	Boring terminated at 16.0 feet.	16.0										

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

☒ At Completion 8.0 ft.
☒ After hours ft.
☐ Water on Rods None ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-2H
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tst Unconfined Compressive Strength	PP-tst Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 98.4											
98.2	Brown Clayey SILT with a trace of Organics (topsoil)	0.2										Honey Creek Bay
	Black Wet Silty SAND (Very Loose)		1		SS			2				
93.9		4.5	5	2	SS			2				
	Blue Gravely Sandy SILT with Organics		3		SS			1				
88.9		9.5	10	4	SS			1				
	Gray SILT											
			15	5	SS			50/3				
82.4	Boring terminated at 16.0 feet.	16.0										Driving on Rocks/Cobbles

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion 2.0 ft.
 ✗ After _____ hours _____ ft.
 ○ Water on Rods 5.0 ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-3H
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.
 Date Completed 8/23/95 Hammer Drop _____ in.
 Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-taf Unconfined Compressive Strength	PP-taf Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 98.3											
	WATER											(Honey Creek)
95.3		3.0										
93.3	Black SAND and GRAVEL with Silt (Medium Dense)	5.0	5									
92.3	Very Soft Material (No Resistance) Assumed Organic layer or "quick SILT, SAND"	6.0										No Recovery
90.3	Gray Medium to Coarse SAND and GRAVEL with Silt	8.0										Medium Stiff
89.3	Brown Sandy Silty CLAY	9.0										Very Stiff
	Boring terminated at 9.0 feet.											

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
 ∇ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-4H
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-taf Unconfined Compressive Strength	PP-taf Pocket Penetrometer	Moisture Content %	Remarks
98.2	Brown Clayey SILT with a trace of Organics (topsoil)	0.2										Honey Creek Bay
			1		SS			4				
	Gray Sandy SILT with trace of Clay and Organics		2		SS			2				
			3		SS			10				
89.4		9.0	4		SS			22				
	Brown Fine SAND											
83.9		14.5	5		SS			35				
	Brown Sandy Silty CLAY											
81.4		17.0										
	Gray Silty SAND		6		SS			30				
77.4	Boring terminated at 21.0 feet.	21.0										

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion 4.0 ft.
 ✗ After hours ft.
 ○ Water on Rods 9.0 ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-1MAlt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.
 Date Completed 8/23/95 Hammer Drop _____ in.
 Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

Date Started	8/23/95	Hammer Wt.		lbs.
Date Completed	8/23/95	Hammer Drop		in.
Boring Method	HSA	Spoon Sampler OD		in.

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tst Unconfined Compressive Strength	PB-tst Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 93.0											
92.0	WATER-	1.0										(Monon Bay)
												No Recovery
	Black Very Soft Sandy SILT with high organic content											Hand Sample
88.0		5.0	5									
	Black Silty CLAY											
86.0	Boring terminated at 7.0 feet.	7.0										

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

☒ At Completion _____ ft.
☒ After _____ hours _____ ft.
☐ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-2M
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.
 Date Completed 8/23/95 Hammer Drop _____ in.
 Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

Date Started	8/23/95	Hammer Wt.		lbs.
Date Completed	8/23/95	Hammer Drop		in.
Boring Method	HSA	Spoon Sampler OD		in.

STRATA ELEV.	SOIL CLASSIFICATION		Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsaf Unconfined Compressive Strength	PP-tsaf Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 93.0												
91.5	WATER		1.5										(Monon Bay)
89.5	Gray Sandy Silty CLAY (Soft) with shells/organics		3.5										
87.5	Brown Sandy Silty CLAY (Medium Stiff)		5.5	5									
85.5	Brown Hard Silty Sandy CLAY		7.5										
	Boring terminated at 7.5 feet.												

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion _____ ft.
 ✕ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-3M
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.
 Date Completed 8/23/95 Hammer Drop _____ in.
 Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

Date Started	8/23/95	Hammer Wt.	_____	lbs.
Date Completed	8/23/95	Hammer Drop	_____	in.
Boring Method	HSA	Spoon Sampler OD	_____	in.

STRATA ELEV.	SOIL CLASSIFICATION		Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tst Unconfined Compressive Strength	PP-tst Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 93.0												
91.5	WATER-		1.5										(Monon Bay)
89.5	Black Very Soft Clay SILT with high amount of organics		3.5										
87.5	Black Soft Clayey SILT		5.5	5									
85.5	Black Medium Stiff SILT		7.5										
	Boring terminated at 7.5 feet.												

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

☒ At Completion _____ ft.
☒ After _____ hours _____ ft.
☐ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
PROJECT NAME Lake Shafer Enhancement Project
PROJECT LOCATION Lake Shafer

BORING # SB-1G
Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
Date Completed 8/24/95 Hammer Drop 30 in.
Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

Date Started	<u>8/24/95</u>	Hammer Wt.	<u>140</u> lbs.
Date Completed	<u>8/24/95</u>	Hammer Drop	<u>30</u> in.
Boring Method	<u>HSA</u>	Spoon Sampler OD	<u>2</u> in.

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsrf Unconfined Compressive Strength	PP-tsrf Pocket Penetrometer	Moisture Content x	Remarks
	SURFACE ELEVATION 96.5											
94.0	WATER~	2.5										Hosgland Bay
	Brown Wet Fine SAND and GRAVEL	5										
88.0	Gray Fine Sandy SILT	8.5										
84.5	Boring terminated at 12.0 feet.	12.0										

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

✓ At Completion _____ ft.
✗ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-1G
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tst Unconfined Compressive Strength	PP-tst Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 96.5											
94.0	WATER	2.5										Hoagland Bay
	Brown Wet Fine SAND and GRAVEL	5										
88.0	Gray Fine Sandy SILT	8.5										
84.5	Boring terminated at 12.0 feet.	12.0										

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

☒ At Completion _____ ft.
☒ After _____ hours _____ ft.
☐ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-2G
 Alt & Witzig File No. SS452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	pp-tsf Pocket Penetrometer	Molature Content %	Remarks
	SURFACE ELEVATION												
	WATER	1.5											Hoagland Bay
	Gray Silty SAND and GRAVEL with Organics	5.5	5										
	Gray SAND and GRAVEL	7.5											
	Gray Clayey SAND (Medium Stiff)	9.5											
	Boring terminated at 9.5 feet.												

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion _____ ft.
 ✗ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-1N
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

Date Started	8/24/95	Hammer Wt.	140	lbs.
Date Completed	8/24/95	Hammer Drop	30	in.
Boring Method	HSA	Spoon Sampler OD	2	in.

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tst Unconfined Compressive Strength	PP-tst Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 91.8											
89.8	WATER	2.0										North Bedford Bay
88.8	Black Very Soft Sandy SILT with Organics (drift wood)	3.0										
	Brown Medium Dense Fine SAND	5										
83.8	Boring terminated at 8.0 feet.	8.0										

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion _____ ft.
 ✓ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-2N
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION		Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Recovery	Ground Water	Standard Test, N	Qu-taf U Compress	PP-taf Pocket P	Moisture	Remarks
	SURFACE ELEVATION 91.8												
		WATER											North Bedford Bay
88.3	x		3.5										
87.3	x	Black Very Soft Sandy SILT with some Organics	4.5										
	o			5									
	o	Brown to Gray Wet SAND and GRAVEL											
84.3	o		7.5										
	o	Brown Medium to Coarse Dense SAND and GRAVEL											
82.3	o		9.5										
		Boring terminated at 9.5 feet.											

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

☑ At Completion _____ ft.
 ☑ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-3N
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.
 Date Completed 8/24/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

Date Started	8/24/95	Hammer Wt.	140	lbs.
Date Completed	8/24/95	Hammer Drop	30	in.
Boring Method	HSA	Spoon Sampler OD	2	in.

STRATA ELEV.	SOIL CLASSIFICATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	SURFACE ELEVATION 91.3											
	WATER											North Bedford Bay
88.3		3.5										
87.3	Black Very Soft Sandy SILT	4.5										
	Gray Fine Silty SAND (Loose to Medium Dense)		5									
85.3		6.5										
	Brown Coarse SAND and GRAVEL (Medium Dense)											
83.3		8.5										
	Boring terminated at 8.5 feet.											

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion _____ ft.
 ✕ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc.
 PROJECT NAME Lake Shafer Enhancement Project
 PROJECT LOCATION Lake Shafer

BORING # SB-1C
 Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/25/95 Hammer Wt. 140 lbs.
 Date Completed 8/25/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 98.3	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-taf Unconfined Compressive Strength	Pp-taf Pocket Penetrometer	Moisture Content %	Remarks
96.8	WATER	1.5										Caranahan Ditch
94.8	Black Sandy SILT with some Organics	3.5										
92.8	Wet Fine SAND (Very Loose)	5.5	5									
90.8	Very Loose Wet Fine SAND	7.5										
88.8	Medium Dense Silty SAND	9.5										
	Boring terminated at 9.5 feet.											

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Groundwater

✓ At Completion _____ ft.
 ✕ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling



CLIENT Commonwealth Engineers, Inc. BORING # SB-2C
 PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452
 PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/25/95 Hammer Wt. 140 lbs.
 Date Completed 8/25/95 Hammer Drop 30 in.
 Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION		Strata Depth	Depth Scale	Sample No.	Sample	Sampler Recovery	Ground	Standard Test, N	Qu- test	Compress	PP- test Pocket	Moisture	Remarks
	SURFACE ELEVATION 98.3													
96.8	WATER		1.5											Carnahan Ditch
94.8	Black Sandy SILT with Organics		3.5											
92.8	Black SILT with trace of Sand		5.5	5										
90.8	Very Loose Wet Fine SAND		7.5											
88.8	Brown Fine to Coarse SAND		9.5											
	Boring terminated at 9.5 feet.													

Sample Type

SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

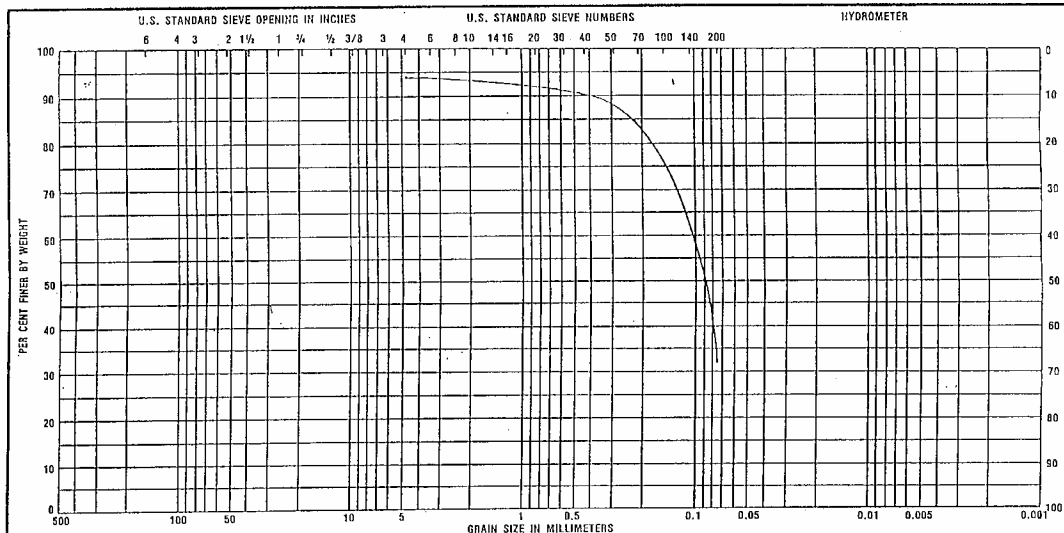
Groundwater

☒ At Completion _____ ft.
 ☒ After _____ hours _____ ft.
 ○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling

GRAIN SIZE DISTRIBUTION CURVE

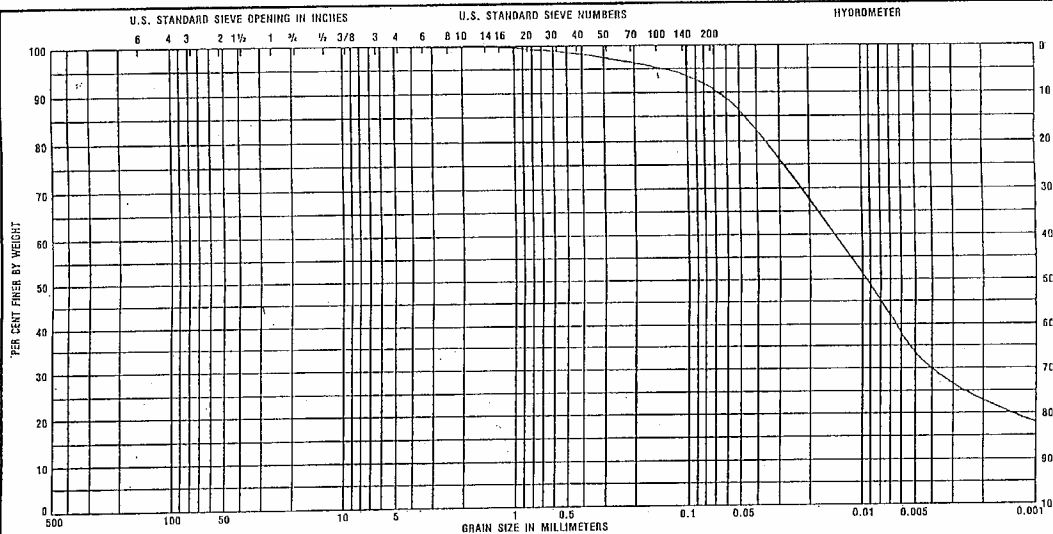


COBBLES	GRAVEL	SAND	SILT OR CLAY
---------	--------	------	--------------

Boring No.	Sample No.	Elev. or Depth	Classification	Moist %	LL	PL	PI	Project
SB-1K		4-6'	Brown Fine Sand					Keans Bay
SB-1H								S5452
								Date



GRAIN SIZE DISTRIBUTION CURVE

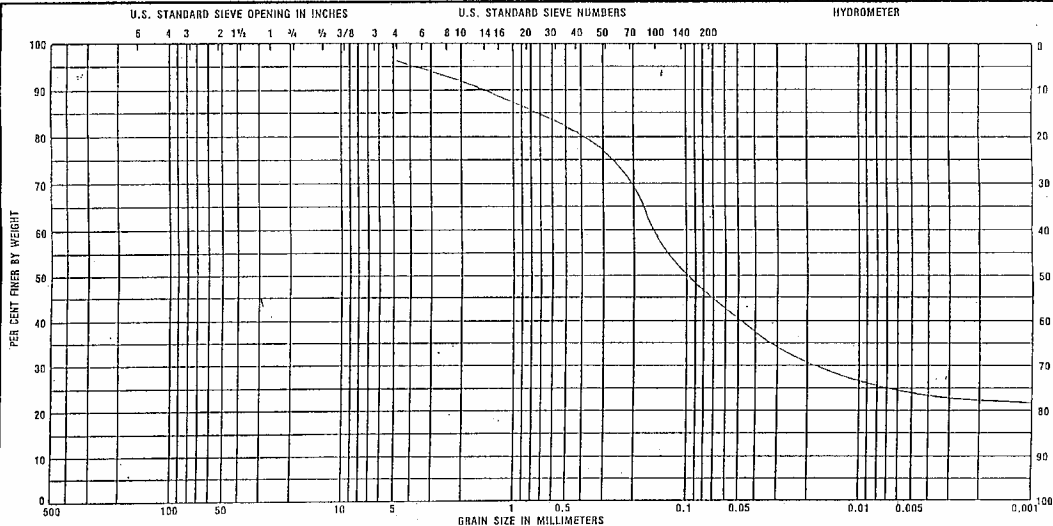


COBBLES	GRAVEL	SAND	SILT OR CLAY
---------	--------	------	--------------

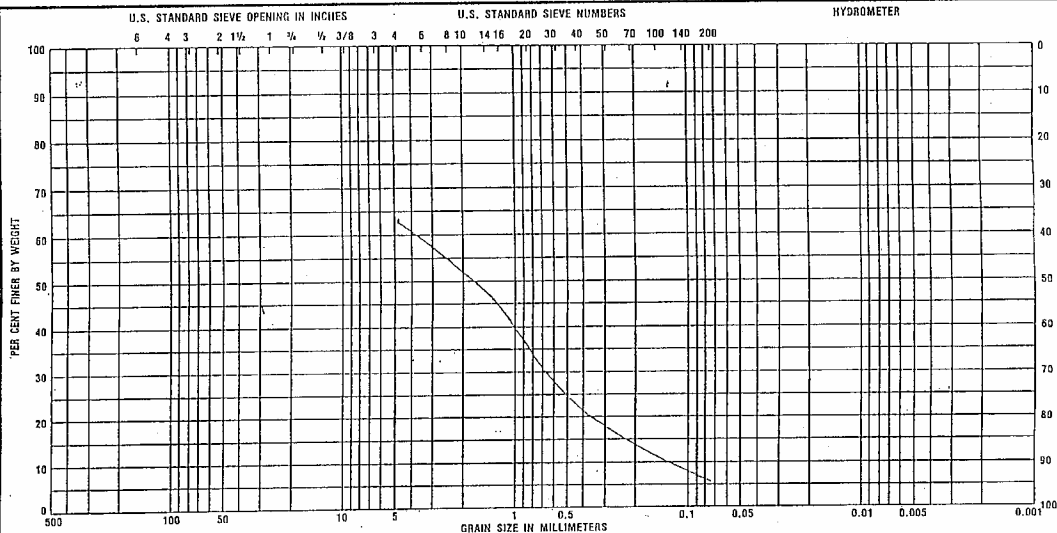
Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
SB-2		2-4'	Gray Silty w/Organic					Keans Bay S5452
								Date



GRAIN SIZE DISTRIBUTION CURVE



GRAIN SIZE DISTRIBUTION CURVE



SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soils unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140-pound hammer falling 30 inches on a 2 inch O.D. split-spoon

Qu: Unconfined Compressive Strength, TSF

Qp: Penetrometer value, unconfined compressive strength, TSF

Mc: Water content, %

LL: Liquid Limit, %

Pl: Plastic Limit, %

Dd: Natural Dry Density, PCF

∇ : Apparent groundwater level at time noted after completion

DRILLING AND SAMPLING SYMBOLS

SS: Split-spoon - 1 3/8" I.D., 2" O.D., except where noted

ST: Shelby-tube - 3" O.D., except where noted

AU: Auger sample

DB: Diamond bit

CB: Carbide bit

WS: Washed Sample

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>TERM</u> (NON-COHESIVE SOILS)	<u>BLOWS PER FOOT</u>
Very loose	0 - 4
Loose	5 - 10
Firm	11 - 30
Dense	31 - 50
Very dense	Over 50

<u>TERM</u> (COHESIVE SOILS)	<u>Qu (TSF)</u>
Very soft	0 - 0.25
Soft	0.25 - 0.50
Medium	0.50 - 1.00
Stiff	1.00 - 2.00
Very stiff	2.00 - 4.00
Hard	4.00 +

PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6mm	Silt	0.74mm-0.005mm
Cobbles	8 in.-3in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.74mm		

CORPS OF ENGINEERS

CHAPTER 7

CHAPTER 7

OPERATION AND MANAGEMENT OF CONTAINMENT AREAS

7-1. General Considerations. This chapter presents procedures for the effective management and operation of containment areas. Management activities are required before, during, and following the dredging operation to maximize the retention of suspended solids and the storage capacity of the areas. These activities include site preparation, removal and use of existing dredged material for construction purposes, surface water management, suspended solids monitoring, inlet and weir management, thin-lift placement, separation of coarse material, dredged material dewatering, and disposal area reuse management. Management activities described in this part are not applicable in all cases, but should be considered as possibilities for improving the efficiency and prolonging the service life of containment areas.

7-2. Predredging Management Activities.

a. Site Preparation. Immediately before a disposal operation, the desirability of vegetation within the containment area should be evaluated. Although vegetation may be beneficial because it helps dewater dredged material by transpiration and may improve the effluent quality by filtering, very dense vegetation may severely reduce the available storage capacity of the containment area and may restrict the flow of dredged slurry throughout the area, causing short-circuiting. Irregular topography within the containment area will directly affect resulting topography of the dredged material surface following the dredging operation. It may be beneficial to grade existing topography from planned inlet locations toward the weir locations to facilitate drainage of the area.

b. Use of Existing Dredged Material. If dikes must be strengthened or raised to provide adequate storage capacity for the next lift of dredged material, the use of the dried dredged material or suitable construction material from within the containment for this purpose will be beneficial. In addition to eliminating the costs associated with the acquisition of borrow, additional storage capacity is generated by removing material from within the area. Consideration should also be given to the use of any coarse-grained material present from previous dredging operations for underdrainage blankets or for other planned applications requiring more select material.

c. Placement of Weirs and Inflow Points.

(1) General placement for site operation and management control. Outflow weirs are usually placed on the site perimeter adjacent to the water or at the point of lowest elevation. The dredge pipe inlet is usually located as far away as practicable from these outflow weirs or at a location closest to the dredging areas. However, these objectives may sometimes be conflicting. If the disposal area is large or if it has irregular foundation topography, considerable difficulty may be encountered in properly distributing the material throughout the area and obtaining the surface elevation gradients necessary for implementation of a surface trenching program. One alternative is to use interior or cross dikes to subdivide the area and thus change the large

area into several smaller areas. Effective operation may require that the dredge pipe location be moved periodically from one part of the site to another, to ensure a proper filling sequence and obtain proper surface elevation gradients. Also, shifting inflow from one point of the site to another and changing outflow weir location may facilitate obtaining a proper suspended solids concentration in disposal site effluent.

(2) Installation and operation of multiple outflow weirs. In conjunction with provisions for moving the inflow point over the disposal site, it may also be worthwhile to contemplate installation of more outflow weirs than would be strictly required by design methods. Availability of more outflow points allows greater flexibility in site operation and subsequent drainage for dewatering, as well as greater freedom in movement of dredge inflow points while still maintaining the flow distances required to obtain satisfactory suspended solids concentrations in disposal site effluent. Also, a higher degree of flexibility in both disposal site inflow and outflow control will allow operation of the area in such a manner that desired surface topography can be produced, facilitating future surface trenching operations.

d. Interior Dike Construction.

(1) Need for interior dike construction. The basic rationale behind the construction of interior disposal area dikes is to subdivide the area into more manageable segments and/or to control the flow of dredged material through the disposal area. Control of material placement is normally to facilitate future disposal site operations, such as dewatering, or to provide proper control of disposal area effluent. Interior dikes may also be used as a haul road and access for movement of material for dike construction or other beneficial uses.

(2) Economics of interior dike construction. As a general rule, the use of interior cross dikes in any disposal area will increase the initial cost of construction and may result in increased operating costs. However, facilitation of disposal site operations, particularly future dewatering, may result in a general reduction in unit disposal cost over the life of the site. The benefit derived from dikes should be evaluated against the amount of disposal volume required for their construction. If the dikes can be constructed from dredged material or material available in the disposal site foundation and subsequently raised with dewatered dredged material, the net decrease in storage capacity will be approximately zero.

(3) Disposal site operation using subareas in series.

(a) Cross dikes may be used to control and direct the inflow and are normally built to allow site subcontainment area (subarea) operation either in series or in parallel. In series, the flow is routed first into one subarea, with sedimentation producing segregation of larger particles, and the overflow from the first subarea is routed to a second subarea where finer particles fall from suspension and then perhaps into another subarea, etc., with the outflow point being located at the end of the last subarea. In some instances, cross dikes are built across the entire site width, and a long overflow weir is provided to allow outflow into the next subarea in the

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series. In other instances, spur dikes are built into the containment area to cause a twisting path for the flow.

(b) In general, the use of series-oriented subdisposal areas should be considered carefully, since the actual result of such use may be the opposite of that desired by the designer. During disposal, coarse-grained sand and gravel will settle very quickly around the disposal pipe location. Other material will remain in suspension, depending on its effective particle size, water salinity, and flow velocity. A subarea can be effective in separating coarse material in an area where later recovery for other use will be easier. As a practical matter, a subarea or containment basin to trap or separate specific silt and clay sizes is rather impractical. A rational design for a series of subareas might require an initial subarea to trap sand and gravel, with the remainder of the material, i.e., the fine-grained fraction, going to a larger subarea. Then, if desired, a final subarea could be used for retention of fine material in conjunction with use of chemical flocculants, to maintain proper water quality in the disposal area effluent. When designing the series of subdisposal areas, care must be taken to obtain adequate size. If the first subarea in the series is filled, it will no longer function and provide the required residence time, and its function must be assumed by the next unit in the series.

(4) Disposal site operation using subareas in parallel. To facilitate site dewatering, operation of interior compartments on a parallel basis may be used. In this concept, flow is initially routed into one compartment; then, when it is filled to the proper depth or when suspended solids concentration standards in the effluent are exceeded, the flow is routed to another portion of the site. This procedure allows more carefully controlled placement of material to the desired thickness throughout the site. Parallel compartments also allow more efficient drying to occur in compartments not in active use since the water ponded for sedimentation is confined to the active compartment (see Figure 7-1).

(5) Sequential dewatering operations. If the disposal site is large enough to contain material from several periodic dredgings, each compartment may be used sequentially for a separate operation. In this manner, a sequence such as the following may be developed. The first compartment is filled, and, after decant, dewatering operations are initiated. As dewatering operations proceed, the next disposal is placed in the second compartment and subsequent disposal in the third, etc. While fresh material is being deposited in part of the site, the dewatered material from the initial placement may be borrowed and used to raise perimeter dikes, facilitating reuse of the initial subarea. This sequence of operations is shown in Figure 7-2.

e. Improvement of Site Access.

(1) Adequate provisions for site access are essential when the long-term operation and management plan for a disposal site includes provision for future dewatering activities and/or removal of dewatered material for dike raising or other productive use. General considerations for site access may include:

(a) Access roads on or adjacent to perimeter and interior dikes.

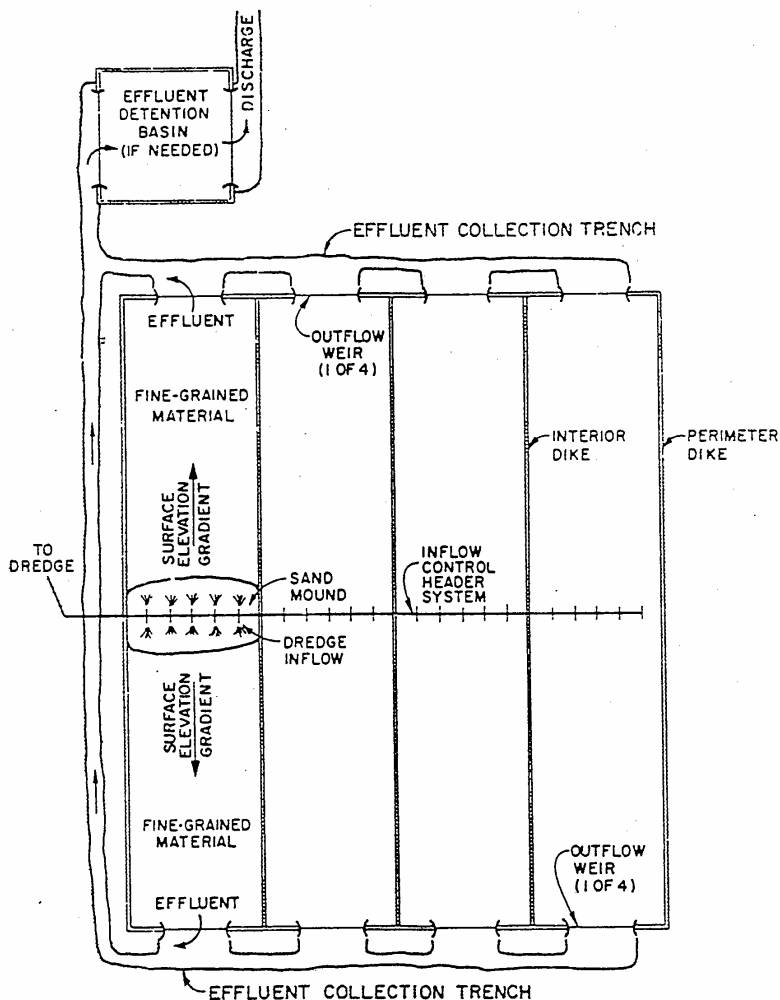


Figure 7-1. Conceptual illustration of disposal site layout to permit parallel compartment use and produce surface topography facilitating future dredged material dewatering

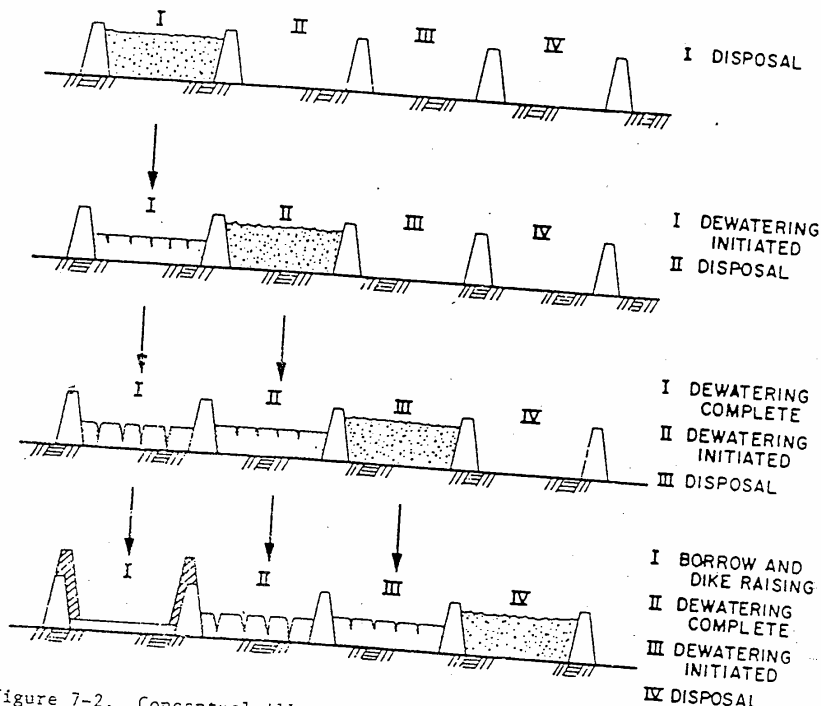


Figure 7-2. Conceptual illustration of sequential dewatering operations

- (b) Crossing points on interior ditches used for drainage or dewatering.
 - (c) Access for equipment and personnel to reach weir structures for repair or maintenance.
 - (d) Ramps for access onto dikes from both inside and outside dike faces.
 - (e) Ramps for pipelines leading to inflow points.
 - (f) Equipment turnarounds.
 - (g) Stockpiles of materials for sandbagging and emergency dike repairs.
 - (h) Offloading ramps for equipment transported by water.
- (2) If future borrow of interior dewatered dredged material is contemplated, it may be most cost-effective to construct small access roads into the area, as a substructure for future haul roads or dragline access. Such stable platforms may be covered with some fine-grained dredged material, but

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their emplacement in the disposal area will allow subsequent equipment operation without immobilization.

f. Scheduling of Dredging Operations to Take Maximum Advantage of Climatic Conditions. Many nonengineering considerations affect the actual time during which disposal operations are conducted. They include:

- (1) Expenditure of funds with respect to fiscal year.
- (2) Relative priority of the operation with respect to other work.
- (3) Lag time necessary to obtain proper specifications preparation and contract advertisement.
- (4) Variation in time when the contractor must move on the job.
- (5) Size of dredge.
- (6) Existing weather conditions.
- (7) Environmental considerations (i.e., dredging windows).
- (8) Lag time required for preparation of the disposal site.

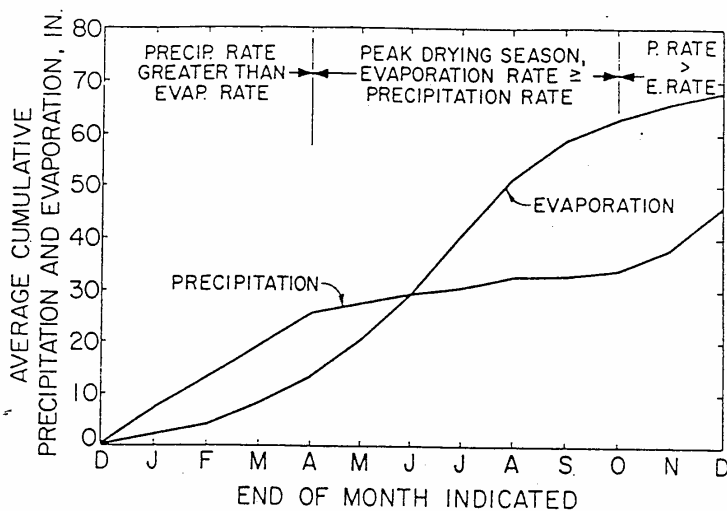
Nevertheless, considerable advantage may be gained, in an engineering sense, from scheduling disposal operations to occur at appropriate periods of the calendar year, depending upon prevailing climatic conditions. By conducting the disposal phase during a period of relatively low evaporative demands, the initial postdisposal activity (i.e., decanting and gradual reduction of ponded water depth) will occur when minimum evaporative forces are available for dewatering. If the disposal operation can be scheduled so that the material reaches the approximate decant-point water content when seasonal evaporation rates begin to be maximized, evaporative dewatering will be facilitated. Dramatic results can occur over short time periods when conditions are prime for drying. Estimation of the calendar period for optimum evaporation, based on projected climatic conditions, is illustrated in Figure 7-3. Examples are from the San Francisco, California, and Mobile, Alabama, areas. If possible, disposal operations should be terminated, ponded water removed, and the material sedimented/consolidated to the decant point by the time (calendar month) when the evaporation rate begins to increase.

7-3. Management During Disposal.

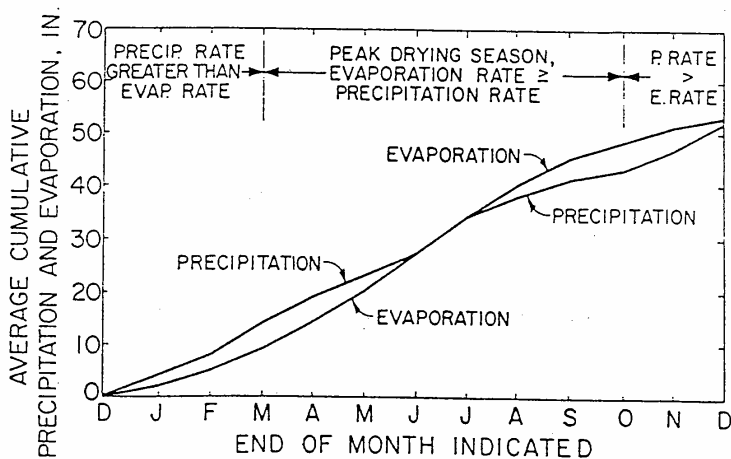
a. Surface Water Management.

(1) The management of surface water during the disposal operation can be accomplished by controlling the elevation of the outlet weir(s) throughout the disposal operation to regulate the depth of water ponded within the containment area. Proper management of surface water is required to ensure containment area efficiency and can provide a means for access by boat or barge to the containment area interior.

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a. San Francisco, California, area



b. Mobile, Alabama, area

Figure 7-3. Illustrations of method for estimating calendar periods when evaporation rates are maximized

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(2) At the beginning of the disposal operation, the outlet weir is set at a predetermined elevation to ensure that the ponded water will be deep enough for settling as the containment area is being filled. As the disposal operation begins, slurry is pumped into the area; no effluent is released until the water level reaches the weir crest elevation. Effluent is then released from the area at about the same rate as slurry is pumped into the area. Thereafter, the ponding depth decreases as the thickness of the dredged material deposit increases. After completion of the disposal operation and the activities requiring ponded water, the water is removed as quickly as effluent water quality standards will allow. Figure 7-4 illustrates the concept.

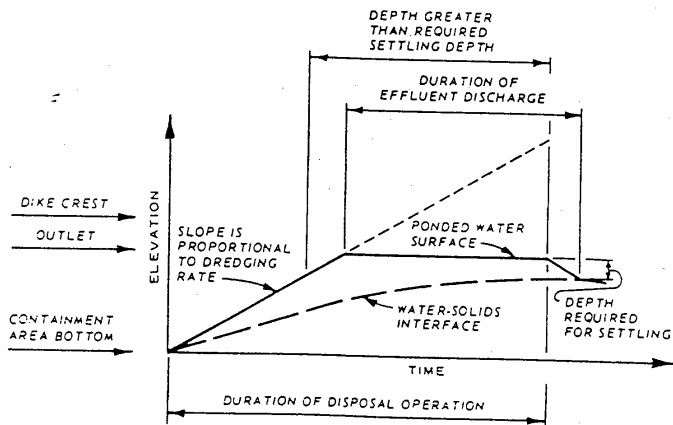


Figure 7-4. Surface water management

b. **Suspended Solids Monitoring.** A well-planned monitoring program during the entire dredging and decanting operation is desirable to ensure that effluent suspended solids remain within acceptable limits or to verify conditions for future design or site evaluations. Since suspended solids concentrations are determined on a grams per litre basis requiring laboratory tests, it is desirable to complete a series of laboratory tests during the initial stages of operation. Indirect indicators of suspended solids concentration, such as visual comparison of effluent samples with samples of known concentration or utilization of a properly calibrated instrument, may then be used during the remainder of the operation, supplemented with laboratory determination of effluent solids concentrations as needed for record purposes.

(1) Samples of both inflow and outflow can be taken for laboratory tests. The solids determination should be made on the samples using the procedure described in Chapter 3.

(2) When the dredging operation commences, samples should be taken from the inlet pipe at approximately 12-hour intervals to verify design assumptions. Effluent quality samples should be taken periodically at approximately

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6-hour intervals during the dredging operation for laboratory solids determinations to supplement visual estimates of effluent suspended solids concentrations. The sampling interval may be changed based on the observed efficiency of the containment area and the variability of the effluent suspended solids concentrations. More frequent sampling will be necessary as the containment area is filled and effluent concentrations increase.

c. Inlet and Weir Management.

(1) If multiple weirs are used, discharging the weirs alternately is sometimes useful for preventing short-circuiting. As the area between the inlet and one outlet fills or as the inlet location is moved, the flow may channelize in a more or less direct route from inlet to weir. If this occurs, the flow should be diverted to another weir. Simultaneous discharge of slurry from several inlets located on the perimeter can also be advantageous, because the lower velocity of the slurry flow results in more pronounced mounding around the edge of the containment area. This mounding in turn increases the slope from inlet to outlet, and drainage will be improved.

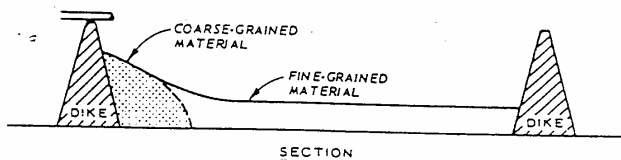
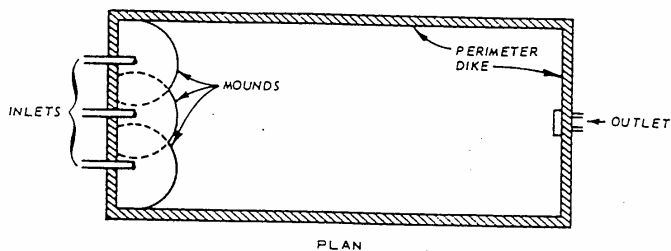
(2) The removal of water following the dredging operation can be somewhat expedited by managing inlets and weirs during the disposal operation to place a dredged material deposit that slopes continually and as deeply as practical toward the outlets. Figure 7-5 shows a containment area with a weir in one end and an inlet zone in the opposite end. Inlets are located at various points in the inlet zone, discharging either simultaneously (multiple inlets) or alternately (single movable inlet or multiple inlets discharging singly). A common practice is to use a single inlet, changing its location between disposal operations. The result of this practice is the buildup of several mounds, one near each inlet location. By careful management of the inlet locations, a continuous line of mounds can be constructed, as shown in Figure 7-5. When the line of mounds is complete, the dredged material will slope downward toward the weir. If the mound area is graded between disposal operations, the process can then be repeated by extending the pipe over the previous mound area and constructing a new line of mounds, as shown in Figure 7-5.

d. Thin-Lift Placement of Dredged Material. Gains in long-term storage capacity of containment areas through natural drying processes can be increased by placing the dredged material in thin lifts. Thin-lift placement also greatly enhances potential gains in capacity through active dewatering and disposal area reuse management programs.

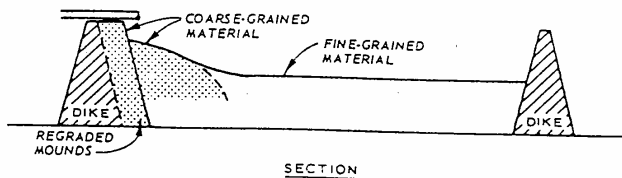
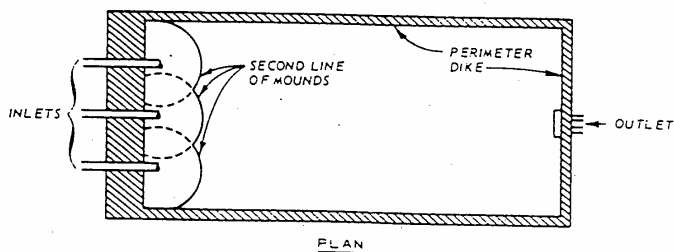
(1) One approach to placing dredged material in thin lifts is to obtain sufficient land area to ensure adequate storage capacity without the need for thick lifts. Implementation of this approach requires careful long-range planning to ensure that the large land area is used effectively for dredged material dewatering, rather than simply being a containment area whose service life is longer than that of a smaller area.

(2) Large containment areas, especially those used nearly continuously, are difficult to manage for effective natural drying of dredged material. The practice of continuous disposal does not allow sufficient time for natural drying. However, dividing a large containment area into several compartments

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a. FIRST LINE OF MOUNDS



b. SECOND LINE OF MOUNDS

Figure 7-5. Inlet-weir management to provide smooth slope for inlet to weir

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can facilitate operation because each compartment can be managed separately so that some compartments are being filled while the dredged material in others is being dewatered.

(3) One possible management scheme for large compartmentalized containments is shown conceptually in Figure 7-2. For this operation, thin lifts of dredged material are sequentially placed into each compartment. The functional sequence for each compartment consists of filling and settling, and surface drainage and dewatering, and dike raising (using dewatered dredged material). The operation must be designed to include enough compartments to ensure that each thin lift is dried before the next lift is placed.

7-4. Postdredging Management Activities.

a. Periodic site inspections and continuous site management following the dredging operation are desirable. Once the dredging operation has been completed and the ponded water has been decanted, site management efforts should be concentrated on maximizing the containment storage capacity gained from continued drying and consolidation of dredged material and foundation soils. To ensure that precipitation does not pond water, the weir crest elevation must be kept at levels allowing efficient release of runoff water. This will require periodic lowering of the weir crest elevation as the dredged material surface settles.

b. Removal of ponded water will expose the dredged material surface to evaporation and promote the formation of a dried surface crust. Some erosion of the newly exposed dredged material may be inevitable during storm events; however, erosion will be minimized once the dried crust begins to form within the containment area.

c. Natural processes often need man-made assistance to effectively dewater dredged material since dewatering is greatly influenced by climate and is relatively slow. When natural dewatering is not acceptable for one reason or another, then additional dewatering techniques should be considered.

d. Removal of coarse-grained material and dewatered fine-grained material for productive uses through Disposal Area Reuse Management (DARM) techniques will further add to capacity and may be implemented in conjunction with dike maintenance or raising. In the case of fine-grained dredged material, DARM is a logical follow-up to successful dewatering management activities. This concept has been successfully used by CE Districts and demonstrated in field studies. Guidelines for determining potential benefits through DARM are found in WES Technical Report DS-78-12 (item 24). Additional information on productive uses of dredged material is found in EM 1110-2-5025.

7-5. Long-Term Management Plans for Containment Areas.

a. Adequate dredged material disposal areas are becoming increasingly difficult to secure in many areas of the country. For this reason, it is necessary that the remaining resources of confined disposal sites be properly utilized and managed. A management plan is a vehicle that can be used to assure the most effective use of containment in future years.

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b. The following objectives would normally be set in the plan development:

- (1) Maximize volumetric disposal capacity.
- (2) Dewater and densify fine-grained material to the greatest extent feasible.
- (3) Reclaim and remove useable material for productive use.
- (4) Maintain acceptable water quality of effluent.
- (5) Abide by all legal and policy and easement constraints.

c. Development of a management plan should include an extensive evaluation of management alternatives based on data accumulated through field investigations and laboratory testing. Integration of the disposal plan with overall navigation system needs is essential. The plan should be developed using the latest available technical approaches for evaluation of the benefits of management practices. A management plan developed for the Craney Island disposal area in the Norfolk District (item 27) is a well-documented example that illustrates how the procedures described in this manual can be used in developing management approaches.

d. A working group or management plan committee is an effective means to ensure that the plan benefits from the input of all District elements. The committee would logically be composed of representatives from Planning, Engineering, and Operation elements. Once a management approach is selected, a monitoring program should be initiated for use in evaluating the effectiveness of management techniques, especially dewatering activities. A monitoring program serves to verify benefits attained and to form a basis for updating or modifying the management approaches.

SEDIMENT PLACEMENT SITE PROGRESS REPORT

Page No. _____

Project: _____
Division: _____
Contractor: _____
Owner: _____

Page 1 of 1

No.	Date	Time Of Day	Location	Weir Elev. (MSL)	Depth To Sediment (feet)	Weather Conditions	Temp (Deg. F)	Turbidity	Effluent TSS (g / L)	Comments
1	/ /	:								
2	/ /	:								
3	/ /	:								
4	/ /	:								
5	/ /	:								
6	/ /	:								
7	/ /	:								
8	/ /	:								
9	/ /	:								
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18	/ /	:								
19	/ /	:								
20	/ /	:								

Turbidity: Low, Medium or High

SECTION 3

ACCESS AND STAGING

1. ACCESS

The Contractor shall be aware of the limited access provided to the existing tributary areas and shall be responsible for providing his own staging areas and for providing adequate and safe access roads and stream crossings.

Any improvements necessary for access across channels may be subject to the Indiana Department of Natural Resources approval. The Contractor shall be responsible to obtain such additional permits and approvals.

Construction operations for access road construction shall be carried out in such a manner and sequence that erosion and air and water pollution will be minimized and held within acceptable limits. Construction methods that enhance fish and wildlife will be used where practical. Trees, stumps, and brush removed from the construction area may be piled for wildlife habitat when approved by the Owner.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

Special attention shall be given to protecting and maintaining key shade, food, den trees, and visual resources. Removal of any trees and brush shall be done in such a manner as to avoid damage to other trees and property.

All trees, stumps, brush, and similar materials are to be removed from the site or disposed of in such a way as to have the least detrimental effect on the environment.

To the extent needed, all suitable materials removed from the excavation areas of the access road shall be used on the construction of the earthfill areas of the access road. All surplus or unsuitable materials shall be disposed of in a manner that will not interfere with the functioning of the road.

Material placed in the fill areas of access roads shall be free of detrimental amounts of sod, roots, frozen soil, stones over six inches in diameter or other objectionable material. The distribution and gradation of materials shall be such that there will be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material.

Topsoil shall be removed and stockpiled on areas where establishment of vegetation is a problem on exposed subsoils (all subsoils except loam, silt loam, and sandy loam, except where dense till is present). Topsoil shall be respread to provide a seedbed.

Where subsoil is exposed or is used in construction, a minimum of 4 inches of topsoil will be placed.

2. STAGING AREA

The Contractor shall locate all equipment, trailers, materials, etc. as near to the excavation sites as possible to minimize traffic conflicts. The Contractor shall also be responsible for providing all temporary power and phone service required.

SECTION 4

PAVEMENT CROSSINGS

1. GENERAL

1.01 Scope

The Contractor shall make himself fully aware with the access to the sediment placement and dewatering sites from each tributary bay/channel area. The Contractor shall be responsible to coordinate with the County Highway Department and private land owners and identify loading limits and safety requirements of the various roadways. All permits and bonds required by the County shall be the responsibility of the Contractor.

The Contractor shall be responsible for any damage to drives, roads, culverts, etc. caused by dredge equipment and material pumping and/or hauling. Any repairs made due to damage caused by the Contractor shall be at his expense. The Contractor shall also keep all roads clean from all mud and other materials at all times, particularly by the end of each day.

The Contractor shall furnish all materials, labor, equipment and do all work necessary to complete the restoration and replacement of permanent pavement for streets, roads, alleys, driveways, etc. that are disturbed and/or specified.

3. PRODUCT

3.01 Pavement Materials

A. Asphalt Pavement Replacement

1. Hot asphalt concrete base materials Class B, or better, shall be in accordance with these specifications and Section 403 of the Indiana Department of Transportation Standard Specifications 1995 (ie. latest edition) INDOTSS. A tack coat per Section 902 shall be applied before placing the surface course.
2. Asphalt surface shall be Class B, or better, Hot Asphaltic Concrete Surface per Section 403, INDOTSS, latest edition.

B. Compacted Aggregate Base

Compacted crushed stone shall be compacted aggregate base meeting the requirements of Section 303 of INDOTSS, latest edition. Aggregate shall meet the requirements for No. 53 coarse aggregate in Article 904.02 of INDOTSS, latest edition.

3.02 Pipe Materials

All pipe crossings shall consist of no less than 12 inches in diameter pipe for the following acceptable products in accordance with the INDOTSS:

- a. Aluminized Type 2 Steel, Corrugated Pipe, 0.064 inch thickness
- b. Reinforced Concrete Pipe, Class 3 per ASTM C76
- c. Welded Steel Casing Pipe, 0.25 inch wall thickness

3. EXECUTION

3.01 Installation

The placement of all pavement materials shall be in accordance with these specifications and the Indiana Department of Transportation Standard Specifications 1995 (ie. latest edition) INDOTSS. All road cuts shall be saw cut prior to removal of the pavement.

A. Asphalt Pavement Replacement

All asphalt road repairs shall consist of no less than a 1 inch Hot Asphaltic Concrete surface mix No. 11 or 12 on 4 inches of HAC base (binder) mix No. 9. in accordance with the INDOTSS, latest edition when existing asphalt pavements are disturbed.

B. Compacted Aggregate Surfaces and Base

All road repairs shall consist of providing no less than 8 inches of compacted aggregate, #53 compacted crushed stone. During construction, all pavement crossings shall be filled with compacted surfaces and bases and maintained to minimize the development of objectionable pavement depressions.

3.02 Pipe Crossings

All pipe crossings shall be backfilled with granular backfill or compacted aggregate as soon as the pipe is placed so as to minimize disturbance to traffic.

3.03 Traffic Control

The Contractor shall plan construction activities to minimize impact to traffic. Local traffic access must be maintained at all times. To maintain traffic movement, appropriate traffic control devices shall be used. Such traffic control devices shall comply with the latest edition of the Indiana Manual on Uniform Traffic Control Devices. The Contractor shall follow the requirements of the INDOT Traffic Control Plan included herein at the end of this section when no other plan is submitted for review.

4. PAYMENT

4.01 Pavement Materials

No separate payment will be made for this item, but the cost for this work shall be included in the cost for Section A-2, Dredging.

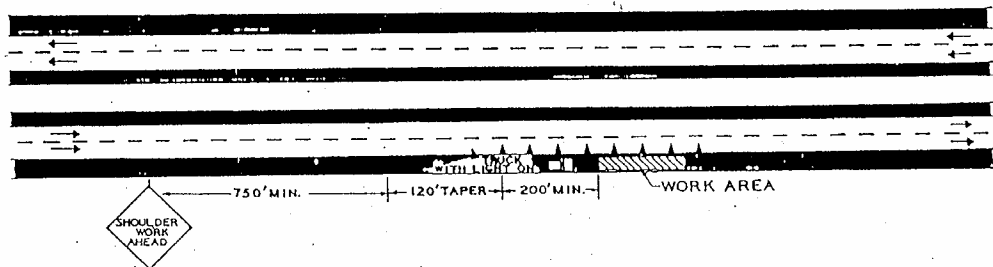
4.02 Pipe Materials

No separate payment will be made for this item, but the cost for this work shall be included in the cost for Section A-2, Dredging.

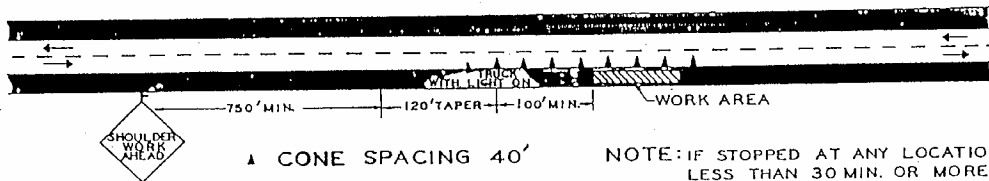
SHOULDER WORK - TRAFFIC CONTROL

DAYLIGHT OPERATION ONLY (WITHIN 15' OF EDGE OF PAVEMENT FOR MORE THAN 30 MIN)

FOUR-LANE ROADWAY



TWO-LANE ROADWAY



▲ CONE SPACING 40'

NOTE: IF STOPPED AT ANY LOCATION
LESS THAN 30 MIN. OR MORE
15 FT. FROM EDGE OF PAVEMENT
SIGNS OR CONES ARE REQUIRED

APPLICANT'S SIGNATURE

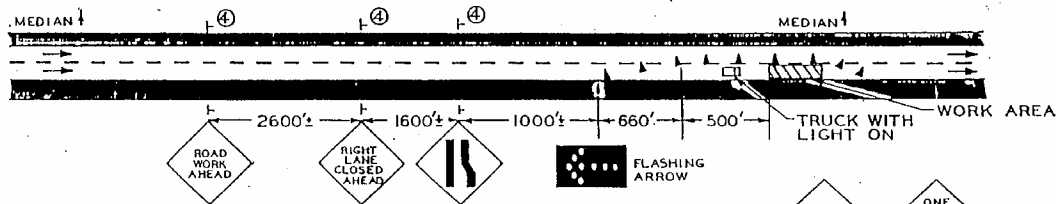
ROAD

COUNTY

ONE LANE OBSTRUCTED - TRAFFIC CONTROL

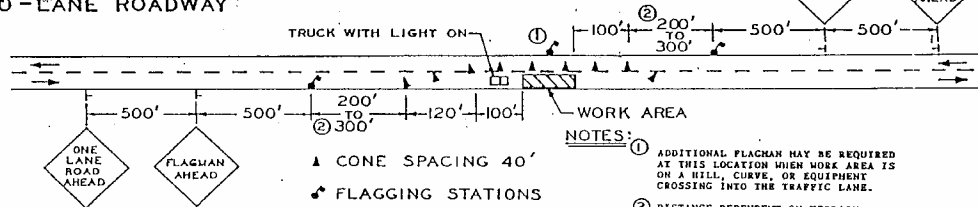
DAYLIGHT OPERATION ONLY (FOR MORE THAN 30 MINUTES)

FOUR-LANE ROADWAY



TWO-LANE ROADWAY

U-2



NOTES:

- ① ADDITIONAL FLAGMAN MAY BE REQUIRED AT THIS LOCATION WHEN WORK AREA IS ON A HILL, CURVE, OR EQUIPMENT CROSSING INTO THE TRAFFIC LANE.
- ② DISTANCE DEPENDENT ON TERRAIN
- ③ IF LESS THAN 30 MIN., ONE LANE ROAD AHEAD SIGN & CONES NOT REQUIRED
- ④ NOT REQUIRED WHEN MEDIAN IS LESS THAN 6 FEET WIDE OR ON LOW VOLUME ROADS

APPLICANT SIGNATURE

ROAD

COUNTY

GENERAL NOTES

1. All material and workmanship shall be in accordance with the Standard Specifications.
2. Barricade Type III-A and Barricade Type III-B with Signs shall include construction signs, typical sign standard, and construction warning lights as shown on the Standard Detour Sign Sheets.
3. Construction Sign Type A and Type B shall include the support, all necessary hardware, and required construction warning lights.
4. The Temporary Bituminous Divider shall include the standard tubular and traffic paint as shown.
5. The pay items for Barricades Type III-A and III-B, Barricade Type III-B with Signs, Type A and B Construction Signs, and Temporary Bituminous Divider shall be in accordance with the Standard Specifications.
6. Wood materials are to be Dimension Lumber in accordance with the Standard Specifications.
7. Standard drums, Type I and Type II Barricades, shall be used on conventional roads, urban streets and arterials. Only standard drums and Type II Barricades shall be used on the expressways, freeways, and other highspeed roadways.
8. Unless otherwise specified, drums, Type I and Type II Barricades, cones, and tubular markers shall be spaced as follows:
 - a) Numerically equal to the posted speed limit, but not less than 20 feet, on tapers;
 - b) 50 feet for a posted speed of less than 40 m.p.h. on tangents;
 - c) 100 feet for a posted speed equal to or greater than 40 m.p.h. on tangents.
9. Standard cones and tubular markers shall be a minimum of 18 inches in height for posted speeds up through 40 m.p.h. and a minimum of 28 inches for posted speeds over 40 m.p.h..
10. Reflectorized bands may be omitted from cones or tubular markers for lane closures during daylight hours.
11. The stripes on Barricades Type I and II shall slope downward toward that side on which the approaching vehicle must pass. For Type III-A and III-B Barricades, the stripes shall slope downward in the direction toward which the traffic must turn in detouring, and where both right and left turns are provided, the striping shall slope downward in both directions from the center of the barricade.
12. All barricades shall have reflectorized striping on those sides which are approachable by traffic. When barricades are approachable by traffic in both directions, specified construction warning lights shall have bi-directional lenses.
13. For Barricades Type I and II less than 3 feet in length, the width of the stripes shall be 4 inches.
14. All barricades shall be weighted with sandbags for stability as shown.
15. The Detour Arrow Sign shall be used only when a detour route has been signed.

16. Unless otherwise specified, construction signs shall be mounted on portable or non-portable supports only as described herein. A portable support is a Typical Sign Standard as shown on this sheet, or small light weight trailer in accordance with the Standard Specifications. Non-portable supports are driven metal or wooden posts as designated on Standard Detour Signs Sheet 3-A and Sign Design Details Sheets 5 and 5-A. All signs shall be mounted such that the message on the sign is level in the horizontal plane after placement.
17. The minimum vertical clearance for construction signs shall be as follows:
 - a) 7 feet between the top of the curb and the bottom of the sign on curbed roadway sections;
 - b) 5 feet between the edge of pavement and the bottom of the sign on non-curbed roadway sections;
 - c) An advisory speed plate, required to be placed with another warning sign, shall be mounted on the post closest to the roadway at a minimum clearance of 4 feet above the edge of pavement. The bottom of the construction warning sign shall not be lower than the top of the advisory speed plate.
18. The minimum horizontal clearance for construction on non-curbed roadway sections shall be as followed:
 - a) The greater of 12 feet from the edge of the pavement or 6 feet from the edge of the paved shoulder to the near edge of the sign for non-portable support mounted signs and for portable support mounted signs during the night-time hours;
 - b) 6 feet from the edge of pavement to the near edge of the sign for portable support mounted signs during daylight hours.
19. The minimum horizontal clearance for construction signs on curbed roadway sections shall be 2 feet from the face of the curb to the near edge of the sign.
20. Lateral placement of construction signs may be adjusted by the Engineer only if R/W is restricted.
21. A 1 foot section of the temporary bituminous divider shall be removed or omitted every 25 feet to provide drainage on tilt pavements.

NOTES:

1. The "Flagger Ahead" sign (W20-7, 48" x 48") may be substituted for the symbol sign (W20 - 7a-A).
2. All distances shown are typical, except for minimum distances and may be varied based on field conditions.
3. In urban areas, the arrow board shall not be placed on the sidewalks exists. The arrow board shall be placed at a distance of $\frac{1}{3} L$ from the beginning of the taper.
4. For those applications not shown on the sheet. Refer to the miscellaneous standard detour sheets.
5. Approved lights shall mark barricades, drums and continuously at night.
6. The spacing at barricades (Type I & II) and cones shall be as follows:
 - (A.) For tapers, the spacing shall be numerically equal in feet to the posted speed limit in miles per hour with a minimum spacing of 20 feet.
 - (B.) For tangents when the posted speed is 40 M.P.H., or greater, the spacing shall 100 feet.
 - (C.) For tangents when the posted speed is less than 40 M.P.H., the spacing shall be 50 feet.

SECTION 5

MISCELLANEOUS METALS AND METAL FABRICATIONS

1. GENERAL

1.01 Scope

- A. The Contractor shall furnish and install all miscellaneous metals necessary to complete the work shown or specified, including that specifically for the weir structure.
- B. In general, the products and methods of execution are presented in WM 22 "Miscellaneous Metals and Aluminum". Only exceptions, additions, and clarifications are contained in this section.

1.02 Product Handling

- A. Store miscellaneous steel members at Project site above ground on platforms, skid or other supports and as required by the manufacturer and ASTM.

1.03 Submittals

- A. Submit shop drawings indicating all shop and erection details including cuts, connections, holes, threaded fasteners and welds.
- B. Do not fabricate until shop drawings are approved.
- C. Submittals on grating shall include load carrying capabilities for the given spans to be installed.

1.04 Compliance and Agency Standards

Comply with applicable portions of the following standards:

- A. American Society for Testing Material (ASTM)
- B. National Association of Architectural Metal Manufacturers (NAAMM).
- C. American Institute of Steel Construction (AISC).

2. PRODUCTS

2.01 General

- A. All materials shall be new and shall conform to the following requirements as appropriate:
 - 1. Galvanizing: ASTM A53.
 - 2. Steel: ASTM A36.

- 3. Steel Plates: ASTM A283.
- 4. Aluminum Plates: ASTM B209.
- 5. Aluminum Tubes: ASTM B221.

B. Fastenings shall match materials fastened.

3. **EXECUTION**

3.01 **Installation**

- A. All work shall be performed per standard practices of AISC and National Association of Architectural Metal Manufacturers.
- B. Provide all angles and other steel supports for all channels, plates, beams, struts, as per notes and details, including bolts, anchors, screws, shop and field connections, and miscellaneous fasteners required to make installation complete.
- C. Wherever dissimilar metals come into contact, neoprene washers, spacers, gaskets or other approved materials shall be inserted between them to provide insulation against electrolytic action.
- D. The fabricator shall verify all dimensions of work adjoining the work hereunder. Such other work shall be inspected before fabrication and installation of items specified herein. Measurements of adjoining work shall be obtained so that work shall fit closely to space provided.
- E. The fabricator shall furnish all necessary templates and patterns required by other trades. He shall also furnish all items except as otherwise specified, pertaining to work hereunder, that are to be built into work.
- F. Prefabricated sheet piling caps are to be installed on all sheet piling for this project.

4. **PAYMENT**

4.01 **Payment**

Costs for all work covered under this Section will not be paid for separately but shall be included within the various related sections for each division.

SECTION 6

SEEDING AND SODDING

1. **SOIL STABILIZATION AND VEGETATION RE-ESTABLISHMENT OF EXCAVATED AREAS** (to override the section WM - 31 Seeding and Sodding Specification)

1.01 **Re-establishment of Permanent Vegetative Cover**

- A. Upon finish grading of work area the CONTRACTOR shall permanently seed and stabilize all final grade areas above the water line.
- B. CONTRACTOR shall attempt to seed during optimal seeding dates. During the growing season optimal dates are March 1 - May 10 and August 10 - September 30. Optimal seeding dates during dormant period (temperatures below 50°) are December 1 through March 28. Seedbed preparation erosion control blankets and mulch can be applied months ahead of actual seeding. Seed can then be applied directly to the prepared seedbeds.
- C. The following combinations of seed will be permissible for their respective applications.

**Permanent Seeding Areas For Finish Grade
Completed Between March 1 and September 30**

Steep Banks and Low Maintenance Areas Not in Channels or Ditches		
Seed Species and Mixture Options	Rates Per Acre	Optimum Soil pH
Smooth brome grass + red clover	30 lbs. 15 lbs.	5.5 - 7.5
Tall fescue + white or ladino clover	45 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + red clover	45 lbs. 15 lbs.	5.5 - 7.5
Lawns and High Maintenance Areas		
Seed Species and Mixture Options	Rates Per Acre	Optimum Soil pH
Bluegrass	130 lbs.	5.5 - 7.0
Perennial ryegrass (turf type) + bluegrass	55 lbs. 80 lbs.	5.6 - 7.0
Tall fescue (turf type) + bluegrass	150 lbs. 25 lbs.	5.6 - 7.5

Channels and Areas of Concentrated Flow		
Perennial ryegrass + white or ladino clover*	190 lbs. 2 lbs.	5.6 - 7.0
Kentucky bluegrass + smooth brome grass + switchgrass + timothy + perennial ryegrass + white or ladino clover*	30 lbs. 15 lbs. 5 lbs. 6 lbs. 15 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + white or ladino clover*	190 lbs. 2 lbs.	5.5 - 7.5
Tall fescue + perennial bluegrass + Kentucky bluegrass	190 lbs. 26 lbs. 26 lbs.	5.5 - 7.5

For best results: (a) legume seed should be inoculated; (b) seeding mixtures containing legumes should preferably be spring seeded, although the grass may be fall seeded and the legume frost seeded; (c) and if legumes are fall seeded do so in early fall.

1.02 Mulch and Over Seeded Areas

A. See Workmanship and Materials Specifications WM 31.

2. ADDITIONAL SEEDING MIXTURE REQUIREMENTS

2.01 Prairie Grass Mixtures

In addition to the above required seed mixtures, an additional prairie grass mixture shall be required over the sediment placement site. This mixture shall be Seed Mixture D in accordance with the Indiana Department of Transportation Standard Specifications, 1995 (or latest) edition and shall consist of 15 lbs of the following mix design:

	<u>Type</u>	<u>Amount</u>
a.	Fowl Mana Grass	1 oz
b.	Carex	2 oz
c.	Rice Cut Grass	2 oz
d.	Bullrush	2 oz
e.	Leptochloa	2 oz
f.	Barnyard Grass	2 Oz
g.	Prairie Wild Rye	2 lb
h.	Perennial Ryegrass	10 lb
i.	Jasper Red Fescue	2 lb
j.	"Fults" Puccinella Distans	2 oz
k.	Redtop	1 lb

3. PAYMENT

3.01 Payment

All costs for work covered under this section shall not be paid for separately but shall be included in Section 2, Sediment Placement Site Earthwork.

PART 9

PROPOSAL DOCUMENTS

PART 9

BID PROPOSAL DOCUMENTS

DIVISION "B" - SEDIMENT PLACEMENT SITE CONTRACT

TABLE OF CONTENTS

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1. Form No. 96 (Revised 1987)	P- 1 - P- 5
a. Bid Price	
b. Time of Completion and Liquidated Damages	
c. Items to be Submitted with Bid	
d. Addenda	
2. Itemized Bid Schedule	P- 6
3. Bid Bond	P- 7 - P- 8
4. Financial Statement	P- 9 - P-16

Form No. 95 (Revised 1987)

BID OF

(Contractor)

(Address)

**FOR
PUBLIC WORKS PROJECTS
OF
SHAPER-FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORPORATION
DIVISION "B"
SEDIMENT PLACEMENT SITE CONTRACT**

Filed _____, 19____

Action taken _____

ACCEPTANCE

The above bid is accepted this _____ day of _____, 19____, subject to the following conditions: _____

Contracting Authority Members:

PART II

(Complete sections I, II, III and IV for all state and local public works projects as required by statutes.)

Governmental Unit: Shafer-Freeman Lakes Environmental Conservation Corp.

Bidder (Firm): _____

Date: _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed?

Contract Amount	Class of Work	When Completed	Name and Address of Owner

2. What public works projects has your organization now in process of construction?

Contract Amount	Class of Work	When to be Completed	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

4. List references from private firms for which you have performed work.

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work.
2. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you expect to require a bond.
3. What equipment do you intend to use for the proposed project?
4. Have you made contracts or received offers for all materials within prices used in preparing your proposal?

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

See Attached Financial Statement

SECTION IV OATH AND AFFIRMATION

I hereby affirm under the penalties of perjury that the facts and information contained in the foregoing bid for public works are true and correct to the best of my knowledge and belief.

Dated at _____ this _____ day of _____ 19____

(Name of Organization)

By _____

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) SS:
COUNTY OF _____)

_____ being duly sworn, deposes and says that he is

_____ of the above _____ and that the
(Title) (Name of Organization)
answers to the questions in the foregoing questionnaires and all statements therein contained are true and
correct.

Subscribed and sworn to before me this _____ day of _____ 19____

Notary Public

My Commission Expires: _____

County of Residence: _____

BID PRICE

The Contractor agrees to perform all the work described in the Contract Documents for a lump sum total price and for the bid prices identified on the attached Itemized Bid Schedules. Payment to the Contractor will be calculated based on these unit and/or lump sum prices for partial payments, not to exceed the lump sum price bid. The total bid price shall be the sum of the total bid price for Divisions "A" and "B" minus any deducts as evidenced by separate letter with the bid.

TIME OF COMPLETION AND LIQUIDATED DAMAGES

If awarded a Contract, the Contractor agrees to begin work within ten (10) calendar days of the effective date of the Notice to Proceed and further agrees to proceed with all possible dispatch to substantially complete and provide all items into operation (service) within 250 consecutive calendar days from the date of the Notice to Proceed and fully complete all work ready for final inspection, acceptance and close-out within 30 additional days from the date of the substantial completion.

If awarded a Contract, and in the case the work is not completed either substantially or fully within the above deadlines to the satisfaction of the Owner, the undersigned agrees to pay to the Owner as liquidated damages the sum of Five Hundred Dollars (\$500.00) per day for each and every successive day, Sundays and Holidays included, after the agreed upon time until the work is completed and accepted by the Owner.

The liquidated damages apply to the failure to meet either the substantially complete and/or the fully complete deadlines stated above.

ITEMS TO BE SUBMITTED WITH BID

The Contractor shall be aware that the following documents are required with his Bid:

1. Bid Guaranty (Bid Bond)
2. Indiana State Form No. 96 (Revised, 1987) with Non-Collusion Affidavit
3. Financial Statement for Bidders
4. Bid Schedules
5. Letter w/Deduct when bidding both Divisions "A" and "B"

ADDENDA

The Bidder hereby acknowledges receipt of the following addenda: _____

ITEMIZED BID SCHEDULE "B"
LAKE SHAFER LAKE ENHANCEMENT DESIGN PROJECT
AREA 1 - HONEY CREEK
DIVISION B: SEDIMENT PLACEMENT SITE CONTRACT

<u>Item No.</u>	<u>Description</u>	<u>Qty.</u>	<u>Units</u>	<u>Unit Price (in words)</u>	<u>Unit Price</u>	<u>Total Price</u>
1	Mobilization, Bond, and Other	1	L.S.	_____	\$ _____	\$ _____
2	Sediment Placement Site Earthwork	1	L.S.	_____	\$ _____	\$ _____
TOTAL LUMP SUM BID OF DIVISION B ALL ITEMS (1, and 2)				\$ _____ *		
				(in figures)		
TOTAL LUMP SUM BID OF DIVISION B ALL ITEMS (1, and 2)				_____ *		
				(in words)		

* The total base bid amount shown here must agree with the amount shown on Form 96, page P-2.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____
_____ as Principal, and _____
_____ as Surety, are hereby held and firmly bound unto the Shafer-Freeman Lakes
Environmental Conservation Corporation (SFLECC) as OWNER in the penal sum of _____
_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind
ourselves, successors and assigns.

Signed, this _____ day of _____, 19_____.

The Condition of the above obligation is such that whereas the Principal has submitted to _____
_____ a certain BID, attached hereto and hereby made a part hereof
to enter into a contract in writing, for the _____

NOW, THEREFORE,

(a) If said BID shall be rejected, or
(b) If said BID shall be accepted and the Principal shall execute and deliver a contract
in the Form of Contract attachment hereto (properly completed in accordance with said BID) and
shall furnish a BOND for faithful performance of said contract, and for the payment of all persons
performing labor furnishing materials in connection therewith, and shall in all other respects perform
the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise
the same shall remain in force and effect; it being expressly understood and agreed that the liability
of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this
obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and
its BOND shall be in no way impaired or affected by any extension of the time within which the
OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

Surety

By: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

Financial Statement for Bidders

Submitted to.....

By..... { A Corporation
 { A Co-partnership
 { An Individual

Address.....

Date submitted....., 19.....

Contractor's Financial Statement

Submitted by..... { ☐ A Corporation
☐ A Co-partnership
☐ An Individual
with principal office at.....
To.....

Condition at close of business..... 19.....

ASSETS		Dollars				Cts.
1. Cash: (a) On hand \$....., (b) In bank \$....., (c) Elsewhere \$.....						
2. Notes receivable (a) Due within 90 days.....						
(b) Due after 90 days.....						
(c) Past due.....						
3. Accounts receivable from completed contracts, exclusive of claims not approved for payment.....						
4. Sums earned on uncompleted contracts as shown by engineer's or architect's estimate.....						
(a) Amount receivable after deducting retainage.....						
(b) Retainage to date, due upon completion of contracts.....						
5. Accounts receivable from sources other than construction contracts.....						
6. Deposits for bids or other guarantees: (a) Recoverable within 90 days.....						
(b) Recoverable after 90 days.....						
7. Interest accrued on loans, securities, etc.....						
8. Real estate: (a) Used for business purposes.....						
(b) Not used for business purposes.....						
9. Stocks and bonds: (a) Listed—present market value.....						
(b) Unlisted—present value.....						
10. Materials in stock not included in Item 4 (a) For uncompleted contracts (present value).....						
(b) Other materials (present value).....						
11. Equipment, book value.....						
12. Furniture and fixtures, book value.....						
13. Other assets.....						
Total assets.....						
LIABILITIES						
1. Notes payable: (a) To banks regular.....						
(b) To banks for certified checks.....						
(c) To others for equipment obligations.....						
(d) To others exclusive of equipment obligations.....						
2. Accounts payable: (a) Not past due.....						
(b) Past due.....						
3. Real estate encumbrances.....						
4. Other liabilities.....						
5. Reserves.....						
6. Capital stock paid up: (a) Common.....						
(b) Common.....						
(c) Preferred.....						
(d) Preferred.....						
7. Surplus (net worth).....						
Total liabilities.....						
CONTINGENT LIABILITIES						
1. Liability on notes receivable, discounted or sold.....						
2. Liability on accounts receivable, pledged, assigned or sold.....						
3. Liability as bondsman.....						
4. Liability as guarantor on contracts or on accounts of others.....						
5. Other contingent liabilities.....						
Total contingent liabilities.....						

DETAILS RELATIVE TO ASSETS

1	(a) on hand..... Cash (b) deposited in banks named below..... (c) elsewhere—(state where).....	\$.....	
NAME OF BANK	LOCATION	DEPOSIT IN NAME OF	AMOUNT

2	Notes receivable (a) due within 90 days..... (b) due after 90 days..... (c) past due.....	\$.....		
RECEIVABLE FROM: NAME AND ADDRESS	FOR WHAT	DATE OF MATURITY	HOW SECURED	AMOUNT

Have any of the above been discounted or sold?..... If so, state amount, to whom, and reason.....

3	Accounts receivable from completed contracts exclusive of claims not approved for payment.....	\$.....	
NAME AND ADDRESS OF OWNER	NATURE OF CONTRACT	AMOUNT OF CONTRACT	AMOUNT RECEIVABLE

Have any of the above been assigned, sold, or pledged?..... If so, state amount, to whom, and reason.....

4	Sums earned on uncompleted contracts, as shown by engineer's or architect's estimate: (a) Amount receivable after deducting retainage..... (b) Retainage to date due upon completion of contract.....						\$.....
DESIGNATION OF CONTRACT AND NAME AND ADDRESS OF OWNER	AMOUNT OF CONTRACT	AMOUNT EARNED	AMOUNT RECEIVED	RETAINAGE		AMOUNT EXCLUSIVE OF RETAINAGE	
				WHEN DUE	AMOUNT		

Have any of the above been sold, assigned, or pledged?..... If so, state amount, to whom, and reason.....

* List separately each item amounting to 10 per cent or more of the total and combine the remainder.

DETAILS RELATIVE TO ASSETS (Continued)

5* Accounts receivable not from construction contracts..... \$.....

RECEIVABLE FROM: NAME AND ADDRESS	FOR WHAT	WHEN DUE	AMOUNT
.....
.....
.....
.....
.....
.....
.....

What amount, if any, is past due..... \$.....

6 Deposits with bids or otherwise as guarantees..... \$.....

DEPOSITED WITH: NAME AND ADDRESS	FOR WHAT	WHEN RECOVERABLE	AMOUNT
.....
.....
.....
.....
.....
.....
.....

7 Interest accrued on loans, securities, etc..... \$.....

ON WHAT ACCRUED	TO BE PAID WHEN	AMOUNT
.....
.....
.....
.....
.....
.....

8 Real estate { (a) Used for business purposes..... \$.....
book value { (b) Not used for business purposes.....

DESCRIPTION OF PROPERTY	IMPROVEMENTS		TOTAL BOOK VALUE
	NATURE OF IMPROVEMENTS	BOOK VALUE	
1
2
3
4
5
6
7

LOCATION	HELD IN WHOSE NAME	ASSESSED VALUE	AMOUNT OF ENCUMBRANCES
1
2
3
4
5
6
7

* List separately each item amounting to 10 per cent or more of the total and combine the remainder.

9 Stocks and bonds: (a) Listed—present market value..... \$.....
(b) Unlisted—present value.....

DESCRIPTION	ISSUING COMPANY	LAST INT. OR DIV. PAID		PAR VALUE	PRESENT MARKET VALUE	QUANTITY	AMOUNT
		DATE	%				
1							
2							
3							
4							
5							
6							
7							

	WHO HAS POSSESSION	IF ANY ARE PLEDGED OR IN ESCROW, STATE FOR WHOM AND REASON	AMOUNT PLEDGED OR IN ESCROW
1			
2			
3			
4			
5			
6			
7			

10	Materials in stock and not included in Item 4, Assets:	
	(a) For use on uncompleted contracts (present value)..... \$ (b) Other materials (present value)..... \$	

[illegible]

11* Equipment at book value.....\$

[illegible]

Are there any liens against the above?..... If so, state total amount..... \$

* If two or more items are lumped above, give the sum of their ages.

DETAILS RELATIVE TO ASSETS (Continued)

12 Furniture and fixtures at book value..... \$.....

13 Other assets..... \$.....

DESCRIPTION	AMOUNT

TOTAL ASSETS :

DETAILS RELATIVE TO LIABILITIES

1 Notes payable { (a) To banks, regular..... \$.....
 (b) To banks for certified checks.....
 (c) To others for equipment obligations.....
 (d) To others exclusive of equipment obligations.....

TO WHOM: NAME AND ADDRESS	WHAT SECURITY	WHEN DUE	AMOUNT

2 Accounts payable { (a) Not past due..... \$.....
 (b) Past due.....

TO WHOM: NAME AND ADDRESS	FOR WHAT	DATE PAYABLE	AMOUNT

3 Real estate encumbrances (See Item 8, Assets)..... \$.....

4 Other liabilities..... \$.....

DESCRIPTION	AMOUNT

5 Reserves..... \$.....

INTEREST	INSURANCE	BLDGS. & FIXT.	PLANT DEPR.	TAXES	BAD DEBTS		
\$.....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....

6 Capital stock paid up { (a) Common..... \$.....
 (b) Preferred.....

7 Surplus..... \$.....

TOTAL LIABILITIES :

If a corporation answer this:

Amount for which incorporated.....

Capital paid in cash..... \$.....

When incorporated.....

In what state.....

Names and titles of all persons having authority to execute and receipt estimate vouchers and to conduct other business for the corporation, including its officers, the signatures of whom are legally binding.

.....

.....

.....

.....

.....

Do you have necessary "certificate of authority" to transact corporate business in this state, under the terms of Chapter 215, Acts of 1929, and acts amendatory thereto?.....

If a co-partnership answer this:

Date of organization.....

State whether co-partnership is general, limited or association.....

Give the names, addresses and proportional interests of all parties:

Name	Address	Share
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....
.....	\$.....

The name of the partnership firm under which the above partners are operating is.....

Give names and titles of all persons having authority to execute and receipt estimate vouchers and to conduct other business for the partnership, the signatures of whom are legally binding.

The undersigned hereby declares that the foregoing is a true statement of the financial condition of the individual, co-partnership or corporation herein first named, as of the date herein first given; that this statement is for the express purpose of inducing the party to whom it is submitted to award the submitter a contract; and that any depository, vendor or other agency herein named is hereby authorized to supply such party with any information necessary to verify this statement.

NOTE: A co-partnership must give firm name and signatures of all partners.
A corporation must give full corporate name, signature of official and affix corporate seal.

Affidavit for Individual

STATE OF _____ }
COUNTY OF _____ } ss:

_____ being duly sworn, deposes and says that the foregoing financial statement, taken from his books, is a true and accurate statement of his financial condition as of the date thereof and that the answers to the foregoing interrogatories are true.

Subscribed and sworn to before me this

_____ day of _____ 19____

(Applicant must sign here)

Notary Public

Affidavit for Co-Partnership

STATE OF _____ }
COUNTY OF _____ } ss:

_____ being duly sworn, deposes and says that he is a member of the firm of _____; that he is familiar with the books of the said firm showing its financial condition; that the foregoing financial statement, taken from the books of the said firm, is a true and accurate statement of the financial condition of the said firm as of the date thereof and that the answers to the foregoing interrogatories are true.

Subscribed and sworn to before me this

_____ day of _____ 19____

(Member of firm must sign here)

Notary Public

Affidavit for Corporation

STATE OF _____ }
COUNTY OF _____ } ss:

_____ being duly sworn, deposes and says that he is _____ of the _____, the corporation described in and which executed the foregoing statement; that he is familiar with the books of the said corporation showing its financial condition; that the foregoing financial statement, taken from the books of the said corporation, is a true and accurate statement of the financial condition of said corporation as of the date thereof and that the answers to the foregoing interrogatories are true.

Subscribed and sworn to before me this

_____ day of _____ 19____

(Officer must sign here)

Notary Public

PART 10

CONTRACT DOCUMENTS

PART 10

CONTRACT DOCUMENTS

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AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 19____,

by and between Shafer-Freeman Lakes Environmental Conservation Corporation (SFLECC),
hereinafter called "OWNER" and _____ doing business
as (an individual), or (a partnership), or (a corporation) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter
mentioned:

1. The CONTRACTOR will commence and complete the construction of _____
_____.
2. The CONTRACTOR will furnish all materials, supplies, tools, equipment, labor, and
other services necessary for the construction and completion of the PROJECT
described herein.
3. The CONTRACTOR will commence the work required by the CONTRACT
DOCUMENTS within _____ calendar days after the date of the NOTICE TO
PROCEED and will complete the same within _____ calendar days unless the
period for completion is extended otherwise by the CONTRACT DOCUMENTS.
4. The CONTRACTOR agrees to perform all of the work described in the CONTRACT
DOCUMENTS and comply with the terms therein for the sum of \$_____ or
as shown in the BID schedule.
5. The term "CONTRACT DOCUMENTS" means and includes the following:
 - (A) Advertisement for BIDS
 - (B) Information for BIDDERS
 - (C) BID
 - (D) BID BOND
 - (E) Non-Collusion Affidavit
 - (F) Compliance Statement (Not Applicable)
 - (G) NOTICE OF AWARD

- (H) Agreement
- (I) Performance BOND
- (J) Payment BOND
- (K) Non-Discrimination Clause (Not Applicable)
- (L) NOTICE TO PROCEED
- (M) CHANGE ORDER
- (N) Certificate of Substantial Completion
- (O) General Conditions
- (P) SUPPLEMENTAL GENERAL CONDITIONS (Not Applicable)
- (Q) DRAWINGS prepared by COMMONWEALTH ENGINEERS, INC.
 Numbered _____ through _____, and dated _____,
 Numbered _____ through _____, and dated _____,
 Numbered _____ through _____, and dated _____,
- (R) SPECIFICATIONS prepared or issued by COMMONWEALTH ENGINEERS, INC.
 Dated _____, 19____, Dated _____, 19____
- (S) ADDENDA:
 No. _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____
 _____, dated _____, 19____

6. The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.
7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in _____ (Number of Copies) each of which shall be deemed an original on the date first above written.

OWNER: **SFLECC**

By: _____

Name: _____
(Please Type)

Title: _____

(SEAL)

ATTEST:

Name: _____
(Please Type)

Title: _____

By: _____

Name: _____
(Please Type)

Title: _____

(SEAL)

ATTEST:

Name: _____
(Please Type)

Title: _____

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting
legal representative of _____, do hereby certify as follows:

I have examined the attached contract(s) and performance and payment bond(s) and contractor's Certificate of Insurance and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements are adequate, and have been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

Date: _____

NOTE: Delete phrase "performance and payment bonds" when not applicable.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

Dollars, \$(_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 19____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiary hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of
(Number)
one of which shall be deemed an original, this the ____ day of _____, 19____.

ATTEST:

(SEAL)

(Witness as to Principal)

(Address)

ATTEST:

(Surety) Secretary

(SEAL)

(Witness as to Surety)

(Address)

Principal
BY _____ (s)

(Address)

Surety

BY _____
Attorney-in-Fact

(Address)

NOTE: Date of BOND must not be prior to date of Contract.
If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called PRINCIPAL, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called SURETY are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

_____, Dollars, \$(_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the _____ day of _____, 19____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL, shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, is being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiary hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of
(Number)
one of which shall be deemed an original, this the ____ day of _____, 19____.

ATTEST:

BY _____ Principal _____ (s)

(SEAL)

(Witness as to Principal)

(Address)

(Address)

Surety

ATTEST:

(Surety) Secretary

(SEAL)

(Witness as to Surety)

(Address)

BY _____
Attorney-in-Fact

(Address)

NOTE: Date of BOND must not be prior to date of Contract.
 If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

NOTICE OF AWARD

TO: _____

PROJECT Description: _____

_____ The OWNER has considered the BID submitted by you for the above WORK in response to its Advertisement for Bids dated _____, 19____, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 19____.

SFLECC

(OWNER)

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged.

By: _____
this the _____ day of _____, 19____.
Title: _____

NOTICE TO PROCEED

TO: _____

DATE: _____
PROJ: _____

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 19__, on or before _____, 19__, and you are to complete the WORK within _____ consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 19__.

SFLECC
(OWNER)

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED
is hereby acknowledged by:

this the _____ day of _____, 19__

By: _____

Title: _____

CONTRACT CHANGE ORDER		Order No.:
		Date:
		State: Indiana
Contract For:		County: White
Owner: Shafer-Freeman Lakes Environmental Conservation Corporation		
To:		
<small>(CONTRACTOR)</small> You are hereby requested to comply with the following changes from the contract plans and specifications:		
Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
TOTALS		
NET CHANGE IN CONTRACT PRICE		
JUSTIFICATION: <div style="height: 80px; border: 1px solid black;"></div>		
<p>The amount of the Contract will be (Decreased) (Increased) By the Sum of:</p> <div style="text-align: right; margin-top: 10px;">Dollars (\$ _____).</div> <p>The Contract Total Including this and previous Change Orders Will Be:</p> <div style="text-align: right; margin-top: 10px;">Dollars (\$ _____).</div> <p>The Contract Period Provided for Completion Will Be (Increased) (Decreased) (Unchanged): _____ Days.</p> <p>This document will become a supplement to the contract and all provisions will apply hereto.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p>Requested _____ <div style="text-align: right; margin-top: 5px;">(Owner)</div> </p> <p>Recommended _____ <div style="text-align: right; margin-top: 5px;">(Owner's Architect/Engineer)</div> </p> <p>Accepted _____ <div style="text-align: right; margin-top: 5px;">(Contractor)</div> </p> </div> <div style="width: 45%;"> <p>_____</p> <div style="text-align: center; margin-top: 5px;">(Date)</div> <p>_____</p> <div style="text-align: center; margin-top: 5px;">(Date)</div> <p>_____</p> <div style="text-align: center; margin-top: 5px;">(Date)</div> </div> </div>		

ESCROW AGREEMENT

THIS ESCROW AGREEMENT made and entered into this ____ day of _____, 1997 by and between _____ hereinafter called the Escrow Agent, Shafer - Freeman Lakes Environmental Conservation Corporation, White County, Indiana hereinafter called the Owner, and _____ hereinafter called the Contractor.

WHEREAS, the Owner and the Contractor entered into a contract dated _____, providing for the construction by the Contractor of the _____ Project, for the Shafer - Freeman Lakes Environmental Conservation Corporation subject to the provisions of IC 36-1-12-14, and

WHEREAS, said construction contract provides that portions of payments by the Owner to the Contractor shall be retained by the Owner (herein called Retainage), and

WHEREAS, all retainage shall be deposited in an Escrow Account.

NOW, THEREFORE, it is agreed as follows:

1. The Owner will hereafter deliver or cause to be delivered to the Escrow Agent that portion of the Retainage to be placed in escrow, to be held in escrow in accordance with the terms of this Agreement.
2. The Escrow Agent will promptly invest this Retainage in such obligations as selected by the Escrow Agent at its discretion. All income earned on such funds shall be added to and become a part of the escrowed principal.
3. The Escrow Agent shall pay over the net sum held by it hereunder as follows:
 - a. In the manner directed by the joint written authorization of the Owner and Contractor.
 - b. In the absence of such a joint written authorization, upon receipt from the Owner of a written notice pursuant to Article 18 of the General Conditions showing that the Owner has terminated the employment of the Contractor, then the Escrow Agent shall pay over to the Owner the net sum held by it hereunder.
 - c. In the absence of such a joint written authorization and in the absence of the termination of the employment of the Contractor as provided in b., above, in the manner directed by a certified copy of a judgment of a court of record establishing the rights of the parties to said funds.
4. This Escrow Agreement shall constitute the direction from the Owner and Contractor to the Escrow Agent of the manner in which the Retainage is to be paid by the Escrow Agent, pursuant to IC 36-1-12-14.
5. The Escrow Agent shall deduct, before any payment from the amounts received hereunder, its fee as Escrow Agent, which fee shall be payable from the income earned by the retainage and which escrow fee shall in no event exceed fifty percent (50%) of said income earned.
6. This Agreement and anything done or performed hereunder by either the Contractor or Owner shall not be constructed to prejudice or limit the claims which either party may have

against the other arising out of the aforementioned construction agreement.

7. This instrument constitutes the entire Agreement between the parties regarding duties of the Escrow Agent with respect to the investment and payment of escrow funds; the Escrow Agent is not liable to the Owner and Contractor for any loss or damages other than by its own negligence or willful misconduct.

OWNER
SHAFER - FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORPORATION

By: _____

(Contractor)

By: _____

(Escrow Agent)

By: _____

CERTIFICATE OF SUBSTANTIAL COMPLETION

OWNER's Project No.

ENGINEER's Project No.

Project

CONTRACTOR

Contract For

Contract Date

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To
OWNER

And To
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

.....
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

EJCDC No. 1910-8-D (1983 Edition)

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: _____

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____, 19 _____

ENGINEER

By _____

CONTRACTOR accepts this Certificate of Substantial Completion on _____, 19 _____

CONTRACTOR

By _____

OWNER accepts this Certificate of Substantial Completion on _____, 19 _____

OWNER

By _____

ATTACHMENT TO CERTIFICATE OF SUBSTANTIAL COMPLETION

PUNCH LIST
FOR

.....
(Contract)

.....
(Date)

Item

Value of
Uncompleted
Work